

# COMPUTERWORLD

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## Experts See 145 Microcode as Potential User Bonus

By Stuart Paster

CW Staff Writer

The IBM 370/145 is not now a fourth generation machine, but it does have the required hardware capabilities, according to a consensus of computer experts who consider the availability of user-alterable microcode as being the first characteristic of the fourth generation.

The possibility that IBM will allow the Relocatable Control Storage (RCS) to be altered has ably mitigated several software issues. They would like to see the fourth generation arrive in order to be able to develop software packages that would be more closely tailored to the user's needs.

The aspect of the 145 that has been lacking in prior

models of the 370 is the use of a disk cartridge that contains microcode. Not only does this storage method make the internal microcode easy to change and render it theoretically unlimited in size, but the storage medium intimates that the coding itself could be readily altered and when IBM provides the user and/or other firms with the necessary specifications.

### IBM Must Go Along

It seems inevitable to experts in the area of microcode that IBM will eventually allow the 370 user to generate his own microcoded disks.

One such expert, Lajos L. Rakocsi of Standard Computer Corp., told CW: "I am almost certain that

IBM will come to this. However, the facility to do this should be limited to the very sophisticated user."

In order to implement user-altered microcode, he noted, IBM will have to provide precise documentation, in symbolic form, of the control language and a macro-assembler.

The availability of changeable microcode, Rakocsi added, could prove advantageous to the user who really understands computers.

Standard Computer is the company perhaps most likely to implement user-altered microcode. The four-year-old company has been allowing users to alter instruction sets of its IC systems since their introduction in 1967.

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## 105 Users Tell FCC New Carriers Vital

By Ronald A. Frank

CW Technical News Editor

WASHINGTON, D.C. In unprecedented response to the Federal Communications Commission, more than 100 organizations have gone on record as favoring the establishment of competitive data communications facilities by specialized common carriers.

At present, the FCC spokesman said, about 110 responses have been submitted. Of these, 105 favor the establishment and operation of the new carriers.

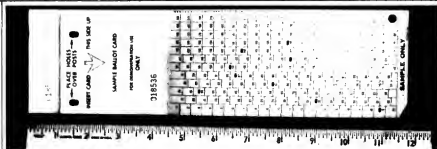
The spokesman said: "The large majority of the responses which we got were from users or people that were affiliated with the computer industry and therefore were interested in data transmission."

When asked whether the large number of responses would influence the commission in ruling on the new carriers, the spokesman said this would certainly be a factor.

He said the commission previously has been aware of the positions held by the carriers, who opposed the new data firms, and the applicants who obviously felt a need existed for their proposed services.

"The users were really the only large group that we had not heard from with any specificity as to why the commission should allow competition," he said. He added that users could also submit reply comments to the positions filed by the existing carriers.

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Close up of three-part punch card of the type used in the Detroit primary. The numbered stub at the left is detached by election worker when voter receives the card. The numbered stub indicated by inches 1-4 is used to check the receipt of the marked ballot. The holes in the body of the card illustrate how a ballot looks after a voter punches it with the stylus. (CW Photo)

## Detroit Mounts Campaign To Improve Nov. 3 Voting

By Thomas J. Morton

CW Staff Writer

DETROIT With the November elections just around the corner, Detroit last week increased the tempo of its search for the solution to a good punch card election despite indications that all the problems of the primary may not be solved.

Speaking for the four-man

board of canvassers for the State of Michigan, the chairman, Muskegon attorney James I. Schoener, said they were satisfied "beyond a reasonable doubt" that the Detroit election in November will be "at least as accurate" as when voting machines were used in the past.

While a Michigan Senate investigation committee headed by Senator George Kuhn (R-W Bloomfield) urged changes in the state's election laws and regulations, chairman Schoener didn't believe they were necessary.

"Two-thirds of the criticism in the Kuhn committee's report," Schoener said, "had to do with clerical errors and nothing to do with punch card voting. Just tightening up the regulations we have already will do the job."

### ACM Offer

The local chapter of ACM here has offered, however, to form an advisory group to assist the city with its preparations for the election which is to be run on punch card voting machines in all 1,111 voting precincts.

City Clerk George Edwards has taken the ACM chapter up on the offer. After the first meeting last week, ACM member Henry R. Gryll said, "We were used as a sounding board to assure the city clerk that there would be no serious objections to going card

to tape."

During the meeting, the ACM group told the city it could see potential loss of control going card to tape, that there could be some serious security and environmental problems involved.

### Card to Tape

In November, the city is planning on going card to tape on small computers, and then running those tapes on a Model 65 or 67 in the total vote count program.

In November, then, Detroit will be getting the vote count program run at one installation.

(Continued on Page 4)

## The 'Innocent' Must Wait

By Joseph Hanson

CW Staff Writer

WASHINGTON, D.C. - Innocent men will have to wait longer to get a trial, and may be held longer in jail, than guilty men because of a new computer ranking system.

The system, designed by the U.S. Attorney's office here, ranks cases according to importance. Serious crimes get high ranks and minor crimes low ranks.

The system also reduces the rank of those cases where the defendant is likely to be found innocent.

Because of overcrowding of the court system, low ranked cases

are more likely to be postponed, and innocent defendants kept in jail.

But guilty men conversely will get tried before innocent men, on the average.

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Each of the 26 U.S. attorneys (equivalent to district attorneys in other cities) must prosecute 100 cases a day, and thus can give most cases only a cursory examination before they actually come before the judge.

Using the Court Calendar Optimization Model (COM), the computer ranks each day's scheduled 100 cases for each U.S. Attorney. The attorney then concentrates on those with a high ranking.

Mrs. Joan E. Jacoby, director of the Washington Office of Crime Analysis and one of the designers of the system, noted that judges always call at the

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# Cooperation Urged for National Data Bank

By Alan Dretell

CW Washington Bureau

PHILADELPHIA A national data center would be more palatable to Congress and perhaps face a more distinct possibility of coming into being if "congressmen who have detailed concerns were given the fullest possible information," according to G. Russell Pipe, legislative assistant to Rep. Jackson E. Berts (R-Ohio).

Pipe's remarks came during a session on "Ethical and Moral Issues in Information Science" at the 33rd annual meeting of the American Society for Information Science (ASIS) held here last week.

There are those who claim that everyone would have access to the data source in a national center. This claim is not taken seriously on Capitol Hill, according to Pipe, "because the number of people possessing the knowledge or access to sophisticated computer hardware is few."

"Attempts to set aside the development of data file structures, problems of access by individuals for input or inspection of their files until after the system is operational would rankle Congress."

"All Congress asks," Pipe said, "is that the same thorough advance planning and rigorous methodology employed in ac-

curate data interpolation be applied to a proposal for a national data center. Justification for present systems and an eventual consolidated unit, in this way, can win congressional respect if not acceptance."

### Improve Dialogue

Pipe called upon ASIS members to improve their dialogue with Congress. "Right now Congress is practicing a strange dichotomy. Billions of dollars are appropriated for EDP but Congress is hesitant about adopting this technology itself. Indeed, many congressmen share a deep sense of uneasiness about this equipment which can retain and reuse almost any bit of

information."

Numerical data banks and information analysis centers also were discussed. Edward J. Brady, associate director for information programs, National Bureau of Standards, said that standardization is necessary to data banks. He added that there are only two reasons for computerizing a data bank: to aid in economy of manipulating the data, and to store for future use. Brady said he was convinced, however, that many data banks have been entered by the capabilities of the computer.

According to Dr. Ralph E. Lapp, an author and industrial consultant who discussed "Pub-

lic Information and Defense Technology," a congressional information system could help offset the organized expertise of the Pentagon—which includes almost unlimited computer time.

### Special Responsibility

He said that the Department of Defense uses this expertise in rushing through its spending programs. "Those in information technology have a special responsibility," he said. "To keep themselves and the public aware of what the Pentagon is really doing."

Some 1,200 information scientists attended the five-day meeting.

## 370/145 'Could' Be Fourth Generation

(Continued from Page 1)

Although IBM in documentation accompanying the 370/145, said, "There is no way for any installation to write data on a [RCS] disk cartridge," some industry sources feel users could alter their 370/145 instruction sets by purchasing non-IBM supplied disks for the RCS.

### Independents at Work

To determine how soon 145 and perhaps other 370 users could expect to get alterable microcode capability, CW

checked with several software firms.

CVC, according to Dr. Efron Mallach, a senior staff analyst, has been interested in microprogramming techniques since they were in laboratory development. He said, "I am happy that the 370/145's microprogramming capabilities are being advertised since it offers tremendous potential for customizing a system."

These could include, he said, special software instructions, special purpose emulators and

central pieces of software, which could be developed at minimum

cost.

"Although we have not seen the specifications for the microprogramming language yet," Mallach said, "we are looking forward to seeing them. We intend to consider the microprogramming of the 370/145 whenever we are developing systems for it."

Several tradeoffs are involved in this consideration, Mallach cautioned. Some of these, he said, are implementation costs vs. execution time, transferability to another CPU, and upgrading to another 370 model that might not offer microprogramming.

A developer of several successful software packages admitted that the firm is actively pursuing the subject of working with microcode in the 370/145's reloadable control storage.

The source indicated that his firm already has the microcode specifications, although he was unwilling to comment further on that aspect of his company's interest in the subject.

Even smaller software houses seem to be interested in the subject, although their approach is predictably still more cautious.

A spokesman for such a firm said his company was looking into the 370/145's control logic, but admitted that at this time not enough knowledge was available to make a judgment.

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## EPOCH 4



GRAHAM MAGNETICS INC.

# Court Calendar Subject to Defendants' Possible Guilt

(Continued from Page 1)

beginning of the day the cases of defendants who are in jail awaiting trial so that the innocent would probably not have to stay in jail longer.

She did admit that a prosecutor can obtain at least a few postponements merely by saying that he is not ready, but she argued that a judge will dismiss such a case if the prosecution asks for a postponement too often.

One defense attorney charged that it is "unrealistic" to depend on the judge to give special consideration to those being locked up awaiting trial.

"The government is abdicating its responsibility to these people. And it is responsible, because a vast majority of them are locked up at the urging of the government."

"Not Just"

Even Mrs. Jacoby admitted that "this is not a just and equitable system for the defendant. It does not work on the assumption that each defendant is innocent until proven guilty."

CCOM began work on the calendar two weeks before the day

under consideration. It ranks the cases and provides a printout with the rank, descriptive material such as case number, and charge, and the probability of winning.

At present, the probability of winning is assigned by the U.S. attorneys themselves, but Mrs.

Jacoby said that the system designers hope within six months to have the computer figure out that probability.

The odds would be based on such information as availability of witnesses, the defendant's previous record, and whether narcotics were involved.

The U.S. attorneys concentrate on those cases with a high rank. For example, in a high priority case, the subpoenas are hand-delivered to witnesses, whereas in low priority cases the subpoenas are mailed.

If an expert witness is scheduled to be in two different

courtrooms at the same time, he is taken to appear on the case with the highest rank.

Thus, low priority cases are more likely to be postponed because of lack of witnesses or because the prosecutor reports that he is unable to try the case.

## Data Users Support FCC Approval of New Carriers

(Continued from Page 1)

The spokesman noted that the FCC is now quite interested in receiving detailed opinions from users rather than general statements of support.

Reply comments to the positions submitted to docket 19-20 are now due early in November, but an extension to this deadline is reportedly being considered.

Among the submissions to the FCC was a paper filed by the Department of Justice, which said an extension to the public interest to authorize new carriers of specialized communications services.

"It is of course important that an announced policy of competitive entry not be frustrated by endless, burdensome and repetitive hearings, by details of access to local distribution channels, or by abuse of the monopoly power of the established carriers."

Among data users that responded to the FCC, the Nocoli

Corp. said: "In view of past experience regarding telephone company service, it is felt that the present common carriers will

Dido Inc. told the commission that "present line costs are prohibitive, therefore there is a need for specialized common car-

## Bell Okayes MCI Connect Talks

WASHINGTON, D.C. — AT&T has notified MCI that it is prepared to discuss interconnection with MCI's Chicago St. Louis microwave link with the Bell network.

In a letter to MCI's President, John Goeken, AT&T said that representatives of Southwestern Bell and Illinois Bell, the two AT&T operating companies geographically affected by the new link, would be available to discuss engineering details of the MCI-Bell interconnections. AT&T had previously maintained such discussions were premature.

AT&T said: "There does not appear to be for any reason why arrangements could not be worked out for interconnection" between MCI and Bell System companies.

Further, AT&T told Goeken that "the appropriate Bell System companies and the appropriate people within those companies are most willing to sit down with you at any time" to receive the specific requirements of MCI and MCI's potential customers.

not be able to cope with the performance requirements of its many users.

The T.H. Watson Co. said the entry of the specialized carriers

## ACM, IBM Try to Help in Upcoming Detroit Election

(Continued from Page 1)

instigated in six, as was done in the August primary.

The ACM group also suggested to the city that a dynamic core dump during the election counting process be instigated, without affecting the count program, as a valid kind of audit check on the system.

The group, according to Grysh, has stressed the amount of work that had to be completed in a short period of time, pointing out to the city that since the card to tape program had not been written, tested, or debugged, they knew of no commercial computer center that would attempt a job of that magnitude in the amount of time remaining.

"There will be 114 ballot rotations in the election, and that means 114 ballot configurations to be tested," he said.

### Recommendation Vetted

The ACM advisory group, in subsequent meetings with the city council, recommended the use of a stud card, which it claimed was available on the market.

James Hall, Datamatica Computer Services, Inc. vice-president, also aware of the problem

with the "standard" card, recommended to the county that another card be used in the November general election. He said to be more improvising to

handling and environmental problems.

According to the Detroit ACM group, the county refused to endorse the purchase and use of the stud card because of an additional cost of about \$5,000.

### IBM to Test Program

According to a Datamatica Computer Service, Inc. spokesman, however, Detroit has contracted IBM to test the vote count program.

"IBM," the spokesman said, "will provide a deck of hand-punched cards which will, in fact, test the program in accordance with the interim rules established by the [Michigan] secretary of state's office."

"They [IBM]," he continued, "will guarantee that the vote count program, the tabulating program, will count the ballots in accordance with the rules and regulations as set forth by the secretary of state's office."

An IBM spokesman confirmed the contract with the City of Detroit. "IBM," said Ed Stupp of the government, education, and medical office of IBM in Detroit, "is not conducting the election of the vendor for that is Datamatica."

"Our relationship on this does not differ from any other customer. The details of the work which we are doing we would keep confidential."

### Stray Shotgun Found

By KEENE, Calif. — Computer analysis of ballistics information led to the location of a stray bullet fired by a police-killing assailant. The bullet was sent to Sacramento for analysis,

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# Business Programmer Exam Has Surprises, Bugs

Special to Computerworld

**SAN JOSE, Calif.**—DPMA's first offering of its Registered Business Programmer Examination (RBPE) was surprising on several counts.

• Cobol was used less in the examination than had been expected, but it was still the most common programming language used.

• Fortran and decision tables appeared to be stressed.

• Operating systems and the extent they have on programming work were totally absent, aside from a few general questions on translators.

• Debugging theory and practice were conspicuous by their absence.

People who sat for the examination also expressed surprise that the flowcharts in the examination failed to conform to any version whatever of the X3.5 standard, or even to the practices of any major computer vendor.

Also, Cobol and Fortran appeared to be neither clearly up-to-date nor conforming to the ANSI standard.

Some attendees noted that some questions asked about things that different computer vendors treat differently in their current implementations of these languages.

But what was of more direct and immediate concern to the people taking the test was the number of typographical, drafting, and clerical errors in the examination—as well as the poor drafting and reproduction job that made parts of some flowcharts unreadable.

Less than a dozen pages of the examination seemed free of such

errors, and some pages suffered from clusters of errors. Some were so serious as to make a few questions meaningless or nonsense, and make a number of others just confusing.

Of the more than 20 persons who had paid the \$40 fee and been accepted for testing, only about 15 actually took the examination. About half of those who took it had been urged to do so by their employers—two DP schools.

The other half came of their own accord. Only one was a member of the Data Processing

Management Association (DPMA).

The unveiling of the examination took place Saturday, Oct. 10, at dozens of test sites across the nation.

The DPMA had developed and tested the examination questions earlier on a pilot basis. If the reception and experience justifies it, the DPMA hopes to offer the examination annually. The examination is distinct and different from the DPMA's older and higher-level CDP (Certificate in Data Processing) examination.

The RBPE came in two parts, each 90 minutes long.

The first section consisted of 130 multiple choice questions, drawn broadly from application programming, conventions and practices. No mathematics beyond grade-school addition, subtraction, multiplication, and division was involved.

More than half of the people completed this part of the examination before the time limit.

The second part consisted of 20 multiple choice questions based on six problems, four of which involved flowcharts. Nearly everyone finished in an hour.

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# Feds 'Field Checking' Computerized Census Conflicts

By a CW Staff Writer  
**MANCHESTER, N.H.** — "A little field work" has been undertaken by federal census officials, in an attempt to reconcile differences between the official U.S. population count and the

city's computerized list. The difference is about 9,000 or more than 10%.

Federal officials confirmed last week that they would do some "door knocking" in order to try to discover why Manchester's

citizen count was 96,722 and the federal count was only 87,152 [CW, Aug. 12].

Several cities have expressed disappointment, even disbelief, in preliminary federal figures which showed declines, or smaller increases than those projected 10 years ago.

Manchester, however, has a computerized annual count to verify its figures, and federal officials have been baggling with local assessors over who is right.

The State of New Hampshire has accepted the city's count, and assessor John McGranahan reported that the city had made over \$90,000 because of the computer work.

A "Room and Meal" tax awarded by the state yielded \$36,000, and the rest came from the state Board of Education. The latter award was based on school population, the former on total population.

Federal officials at the regional census headquarters in Boston have said all along that they could never accept Manchester's figures without actually verifying them. That step is now in progress, with the commencement of the "field work."

In Boston, assistant regional director Arthur Dukakis claimed there were several bugs in Manchester's printout, including at least one instance of duplicate names at the same address.

Dukakis indicated it was possible for the duplicate to indicate only a "Senior-Junior" family situation, but that his verification was made difficult because only one birth date was given.

## Loss of One Digit Brings School Scheduling Snafu

**KINGSTON, Mass.** — One lost column in a punched card caused several high school classes to be scheduled for one room, while scores of other students wandered aimlessly all day long, for lack of a destination.

That's the description given by local and wire service reports of a computerized scheduling snafu at Silver Lake Regional High School here, but employees of the school "didn't know we had a big problem until we read about it in the paper."

There actually were some problems, originally blamed on key-punch errors, but they were not as severe as reported.

Assistant Superintendent Norman Donegan claimed the school committee was "not particularly upset" at the problems, which were reportedly settled in two or three days.

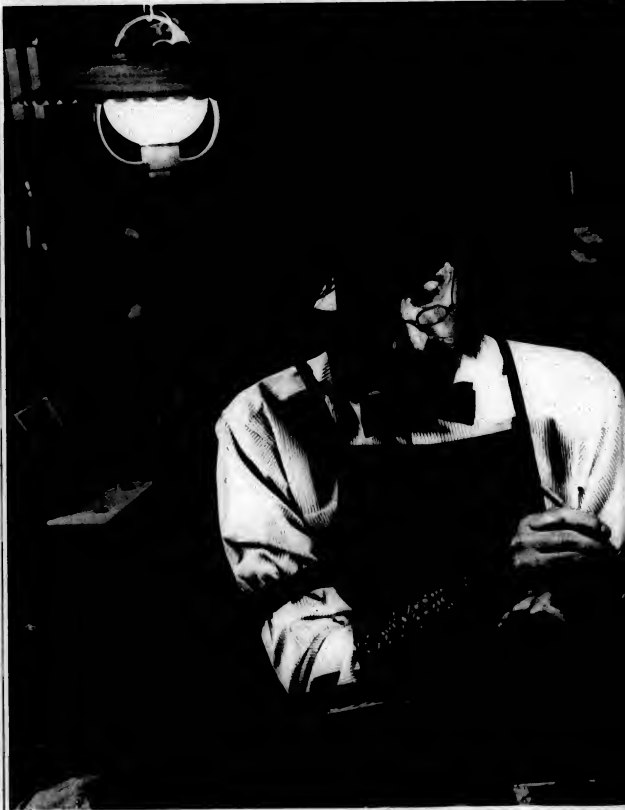
The matter has not been dropped, but there is no intense investigation, either. Donegan indicated that the company involved in the error may lose the computer contract, which is worth \$2,000 a year, but that "we don't plan to stop scheduling by computer."

"In fact, we've even thought about increasing" the applications, he stated.

Donegan said the error apparently was caused when the first digit in a three-column field was dropped. The field indicates Teacher-Department-Subject, and with omission of the teacher, the other categories became jumbled.

In other instances, the teacher indicated had left the school system, causing scheduling prob-

lems for students if a replacement had not been hired.



## Cuyahoga County Cuts Tax Time

**CLEVELAND** — Computers have reduced by 99% the time needed to prepare tax bills, according to officials of Cuyahoga County.

Elimination of much part-time help, plus stabilization in the number of employees in the county auditor's department, have resulted from the reduction from 15,120 man-hours to 150 man-hours.

A much larger saving, percentage-wise, at least, is reflected in the elimination of 7,020 man-hours to update addressograph plates which print legal description changes to the bills.

In addition, fiscal reports are prepared on time, tax revenue is disseminated promptly and accurately, and the county saved \$10,000 by computerizing its voter registration list, officials said.

The budget for the auditor's department has decreased more than \$40,000 during the past 10 years.

## Non-Profit Recycling Co-Op

## 'Revolutionaries' Battling Pollution With DP Waste

By Edward J. Bride

CW staff writer  
SOMERVILLE, Mass. — New England — cradle of the American Revolution — now gives birth to another group of "radicals" — the Recycling Revolution Cooperative (RRC), pledged to help save the ecology by recycling computer waste. Reiterating earlier figures that computer paper is worth at least a penny a pound [CW, Oct. 7],

the cooperative also claims that recycling one ton of paper saves 17 trees. (Earlier reports indicated that five pine trees were required to make up one ton of computer cards.)

The RRC is a non-profit group which grew out of Boston Area Ecology Action, which in turn was designed to create public awareness of ecological problems. While admitting there can be a

strong profit motive for users to recycle computer waste, the RRC said its prime objective is to create "more public concern for the possibilities of recycling all types of 'waste' materials."

A spokesman for the RRC, Rae Burns, said the cooperative functions "as a service to computer installations, and at the same time uses the revenue to support environmental projects." Installations are requested to

position large receptacles in strategic areas, for handling "dumps" of computer output. In nearby Cambridge, a publication of the Massachusetts Institute of Technology noted that computer users could "help the environment by merely dropping your printouts" in these receptacles.

The publication, *Thursday*, printed a map of all MIT drop points, and noted that signs

would remind passers-by of the purpose of the program. The publication called on users to "Read the signs. Use the cans. Save a tree today."

## Disposal Pollutes

RRC obtains "clients" by sending standard-form letters on continuous-form paper to various businesses. The letters offer to the businesses the services of RRC in "setting up a system of collection... and of hauling away the paper products."

RRC coordinators claimed one of the chief benefits of their service is that it prevents the disposal of computer paper by other methods ("all of which are polluters").

The continuous-form letters are stamped with ecological messages, instead of letterheads. The messages read: "This piece of paper was once a part of a tree that lived in a forest where many birds dwelt and deer frolicked." A shorter message notes: "Trees produce oxygen. They can also be used for paper. Which do you need the most?"

Though grammatically incorrect, the question, or some modification of it, is used as a slogan by various groups seeking to protect forests or grasslands. Few, however, have been able to boast of profit motive for ecology, as RRC has.

Users actually "donate" their waste output to RRC, or could "save" it for profit. However, large waste-removal businesses quote prices by the ton.

RRC estimates its revenue according to pounds of papers, rather than tons, because the motive is not profit, but survival.

## Ecology Bandwagon

The ecology bandwagon has more riders, but will probably never be considered overcrowded.

One of the latest corporations to offer its services was the Gillette Co., which announced plans to sign a contract with the federal Bureau of Waste Management for research on recycling. The "contract" is really just an agreement, since only a token payment of one dollar is involved. Subjects of the research will include paper, cardboard, and other cellulose wastes, according to company officials.

Final details are being worked out, according to Gillette. The Bureau of Waste Management is an agency of the Department of Health, Education and Welfare. A company spokesman stated that, if the research is fruitful, Gillette could possibly benefit from projects or contracts involving such recycling.

## Boardwalk Miscalculated

ATLANTIC CITY, N.J. — George Hamid, owner of the Steel Pier here, may scrutinize computer results in the future. A computer printout indicated that the pier would welcome its 100 millionth guest sometime in early July.

A check by mortals discovered an error of 200,000 people. The revised projection for the 100 millionth visitor to the pier was mid-August.

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## Data Processing May Receive Scrutiny At FTC Hearings on Credit Card Billing

CW Washington Bureau

WASHINGTON, D.C. — Although computers are not specifically mentioned, there is little doubt that data processing will come in for some scrutiny Jan. 25 and 26 when the Federal Trade Commission holds public hearings on a proposed trade regulation governing the billing practices of firms that issue credit cards.

The thrust of the proposal is to protect credit card users who have been plagued by billing errors, often blamed on the computer. Sen. William D. Proxmire (D-Wis.) has, in the past, said that responsibility for computer mistakes should be shifted to the credit card companies "where it rightfully belongs."

He added that if the computer system is at fault, "We have the technology to correct" it.

'Major provisions' of the FTC's proposed rule require that a creditor defer further billing statements on disputed charges until it has looked into and explained the facts to the customer; and credit all finance or other charges on a disputed billing to a customer's account, once the dispute is resolved in his favor. A creditor is required to give full particulars of the charges billed to the customer; and notify the customer before giving third parties adverse credit information concerning a disputed charge.

### Other Requirements

In addition, the proposal requires that the creditor issuing billing statements on a monthly basis must mail the statement at least 21 days before the date it will impose finance or late charges for non-payment; post payments to a customer's account based on the day of actual

## Washington Wrap

receipt of payment. A creditor must refund overages paid by the customer unless the statement discloses that the excess payment may be refunded or credited to the customer's account, at his option; and include on the statement the name, address and telephone number of a person authorized to receive customer inquiries concerning mistakes or adjustments.

The billing practices of banks, oil companies, department stores and other retailers are among the firms at which the proposal is aimed. The proposal is called "billing practices arising out of the administration of customer accounts by credit card issuers and other retail establishments."

Credit card issuers and users are invited to submit written views on the proposal to the Assistant Director, Division of Industry Guidance, Bureau of Consumer Protection, Federal Trade Commission, Pennsylvania Ave. and Sixth St., N.W., Washington, D.C. 20580, not later than Jan. 25, 1971.

The hearings, to be held at 10 a.m. Jan. 25 and 26, will be in room 532 of the FTC building in Washington.

### Display Industry Trouble Seen From Standards Lack

GAITHERSBURG, Md. — If standards are not enacted the information display industry will be in trouble economically and performance-wise, Sol Sherr, manager of display planning at Hazeltine Corp., told attendees at a soft copy conference here last week. The conference, sponsored by the National Bureau of Standards and the Society for Information Display, was to shed national and international standards work in the CRT and voice response areas.

Following formal presentations, the approximately 50 industry and government attendees went into workshop groups to discuss functions, practices, human factors and audio response.

Sherr, who is chairman of the ANSI ad hoc committee on displays, presented a paper on the state of display standards. He said the ANSI standards committee has proposed programs for standards activity including nomenclature and definitions, visual parameters, standardized fonts, CRT parameters, control

functions, large screen, and special displays.

Regarding nomenclature and definitions, Sherr said this area was quite critical "because before we can do anything we must have some kind of common language so we'll all know what we're talking about."

### Benchmarks Are the Key For Performance Checks

WASHINGTON, D.C. — "The most important question in any evaluation of a computer should be: 'How long will it take this system to process my workload?'" This statement, made five years ago by Edward O. Joslin, head of the Techniques Division of the Department of the Navy's ADPE Selection Office, is still true today.

The best tool to use to answer this question, Joslin added, in a recent interview, is the benchmark test.

Benchmark testing has been a solid part of the federal government's program for the past five years and all users, public and private, are accustomed to Joslin, could find it an effective tool.

The Navy executive defined a benchmark demonstration as consisting of "a group of representative programs to be run on several different computer systems to obtain comparative throughput performance figures regarding the abilities of the hardware and software of the various computer systems to handle the specific applications in the processing activity in the order and language in which the programs will be processed."

Benchmark testing, he said, actually forces the user into "organized thinking of what is his workload." It can be valuable for both big and small computer buyers, as although checking on a single system might not be too practical, Joslin added.

"Good benchmarks," he continued, "show the user that transfer rates and internal speeds don't matter one-by-one but show how they can all work together to do the job the user needs."

"Benchmarks are the only way I really know that this can be done. Simulation can also do this to a degree, but simulation doesn't really show simultaneity of operations and software influences in a specific case. Simulation can only approximate it."

### Data Bank Debate Delayed Until Next Senate Session

WASHINGTON, D.C. — Senate debate over the measure to provide for direct election of the President and Vice-President has forced cancellation for this session of Congress of the hearings on data banks and invasion of privacy which were to have been launched recently by Sen. Sam Ervin's (D-N.C.) constitutional rights subcommittee. A spokesman for the subcommittee said the hearings will have high priority in the next session.

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## 'Compatibility' With Monopoly? Colorado Ponders the Tradeoffs

By Edward J. Bride

CW staff writer  
DENVER—Casting aside user and vendor criticisms, state officials have tentatively agreed to award a DP monopoly within Colorado colleges.

State Administration Commissioner Bernard E. Teets has announced that a request for proposal (RFP) will soon be circulated, in order to insure "compatibility" for all institutions of higher learning. Specifically exempted are the state's three largest colleges, which already have large computer systems.

### Announcement Qualified

But Teets is not convinced that the single-vendor concept is necessarily the best route to follow, and he qualified his announcement with a notation that some junior colleges already using computers may retain an autonomous status.

He said that the state Commission for Higher Education (CHE) was being "adamant that you had to have one brand in order to get a degree of compatibility necessary" for efficient operation, but that other DP experts disagreed.

Teets also stated that the idea of tying into one vendor might restrict the state from improvements made by other vendors.

Furthermore, Teets noted that some smaller institutions, "depending on the mission," might not need to participate in the "systems-sharing" program being pushed by CHE.

The Chess (CHE Systems Sharing) idea was announced over a year ago, and "still represents our primary goal so far as computing is concerned," said J. Raymond Pitkiser, associate coordinator of CHE.

### Share People, Software

Under Chess, the users would have "local hardware support...consistent with mission, compatible with all other system elements." A CHE brochure describes the idea as "people and software resources shared among all institutions in a cooperative, participative manner."

Chess strategy is the other alternative to centralization or decentralization, according to the brochure.

Pitkiser is "pleased" that the concept may come to fruition, despite criticism that it may also create a monopoly.

Colorado was criticized by several vendors during the summer of 1969, regarding the "prominence of IBM in the state's DP inventory."

Last fall, students charged that pro-IBM bias was slowing the selection of computers for the Community College of

Denver and Metro State College, both of which later acquired the non-IBM computers they had selected.

However, those NCR and XDS computers were delivered in late spring, barely in time for hands-on experience for graduating students in the DP course.

The approval and installation of the computers was one of the first items taken for action when Teets became administration commissioner last year.

Both Teets and Pitkiser acknowledge that either the XDS or NCR computer, or both, may have to be removed under the Chess idea, despite the fact that DP committees of the schools had personally selected the machines.

Teets has asked officials of all 12 institutions involved in the prospective RFP to submit their ideas on compatibility, mission, and needs by Nov. 1.

## Safe Source Says Some Safes Are Safer

NEW YORK—Ah, there's nothing like that secure feeling you have when you know your tapes are all nicely tucked away in the vault, protected from magnets and light-fingered programmers, and fires, is there?

Well, when you find out that all your tapes and disks were destroyed in the fire while sitting in their fire-proof safe, you may find that your secure feeling was misplaced.

For there are fire-proof safes and fire-proof safes, and the ones that serve the accounting office to store ledgers are not going to work for storage of microfilm or disks.

Paper can sit happily in 350° heat without curling a corner, but the oxide coating on a tape or disk, or the emulsion on microfilm start deteriorating at only 150°.

The Safe Manufacturers National Association has developed a special classification for safes intended to store EDP media, and has formulated standards for such boxes.

Called Class 150 fire-insulated record container data processing safes, they are designed to protect against fire, smoke, and moisture—as well as theft. While a regular safe has just one wall, a class 150 is a safe within a safe, with double-insulating properties.

The Class 150s are also designated with an hour rating, 1, 2, 3, or 4, showing how long they are designed to withstand a fire.

Underwriters Laboratories rates the safes by loading them with EDP records and exposing them to a furnace fire for their time rating. After the sample safe has cooled down the records are checked for deterioration.

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## Banks Need Access In Fund Transfers

QUEBEC—"The savings banks of Connecticut, or Massachusetts, or New York, or any state, will not be able to survive in an environment of banking which links credit cards to point-of-sale terminals and to fund transfer computers, unless they too can issue the cards and have free access to the system," according to Dale L. Reistad, president of Payment Systems Inc.

Speaking to the 68th Annual Convention of the Savings Banks' Association of Connecticut, held here early this month, Reistad said, "The year 1970 marks the beginning of the era of the electronic fund transfer systems. The decade of the 70's will see the pilot tests, the spawning of new generations of equipment, and the routine acceptance of electronic transfers as the step beyond credit cards."

"People will accept point-of-sale terminals in 1973 as they accept credit card embosers today."

## Editorials

### Do Yourself a Favor

If there is even a slight possibility that you will be able to attend the Fall Joint Computer Conference next month, we urge you to preregister now. Frankly, it's in your own best interests. Action now will help to guarantee you a hotel room and reduce the time it takes to sign in at the conference.

But there's more at stake than your own comfort. The American Federation of Information Processing Societies, the conference sponsor, needs to know how many attendees to expect. (It's pretty unwise to plan an affair without knowing whether 10,000 or 100,000 persons will attend.) In the past, Afips could project attendance fairly accurately. But because of the current state of the economy, projections based on past experience may be way off.

So do yourself and Afips a favor and fill out the registration and reservation forms on Page 22.

## Scolded by Manufacturers

### Problems Underestimated in Library Automation

WASHINGTON, D.C. — Librarians are more than repositories for books. At least that is the way Burton E. Lamkin, the associate U.S. commissioner of education for libraries and educational technology, sees it.

"We look at computers as being one of any number of different tools and techniques for accomplishing certain types of end results," said Lamkin, sworn in last July to head the Office of Education's Bureau of Libraries and Educational Technology.

A former research librarian at Honeywell and library manager at IBM, Lamkin said he looks at libraries as being one of the main resources already existing in our country with which we can reach the community.

"I also think the need for machines — the right kind of machines — doing the right kind of jobs is extremely critical to the development of any kind of community service."

Lamkin has formulated what he calls a "national plan" which would, in effect, make libraries more meaningful for people and more relevant in today's society. The bureau is trying to create a climate under which people will not regard libraries as containers for books and librarians as their custodians. Instead, he wants people to see libraries as educational institutions and librarians as educators.

"With the masses of information we have," he said, "computers offer some unique opportunities for us. Except, manufacturers tend to emphasize commercial and sales aspects of their computers rather than the problems they help solve per se."

"Computer manufacturers have not necessarily given the library field the same fairly extensive kinds of machines that should be designed to meet the particular needs that we have."

"We need some fairly extensive basic investigations to determine exactly how to go about doing some fairly simple things. Very few computer systems have really been successful totally in terms of meeting the institutional needs and also meeting the economic situations that they faced."

"I don't think we've ever looked at the problems of transferability of hardware and software. We've never looked at pure research in terms of how to deal with large data bases — how to store and deal with them in terms of handling."

Many librarians are leery of computers, according to Lamkin, and he believes this non-receptiveness can be blamed in part on overzealous hardware salesmen "who come on so strong that an individual's faith in computers is shaken and just never restored."

Salesmen, he explained, tend to oversimplify the information input and retrieval problems peculiar to libraries. "They come in and say: 'There's nothing to it. We'll just put everything on machines and have it solved.' Unfortunately, they tend to underestimate the enormity of the data, he added."

"This bureau," said Lamkin, "may in the future have a role in bringing manufacturers and users together and act as a catalyst in helping them understand each other's problems better."

Libraries can still utilize manpower quite cheaply, Lamkin said, and often do not have to go to computerization to accomplish things more economically. "Most big libraries, in fact, have more of a problem when they automate than they did before because of conversion troubles and input limitations."



'Hey, That's What I Really Call Educational TV!'

## Letters to the Editor

### People Alone 'Goof', Make Computer Errors

In reference to your article "A Lesson for the Computer Community" [CW, Sept. 23] I for one am quite taken aback by the advertisement that Restaurant Preferred ran in the Washington newspapers. Quite "We have goof-proof computers. They're called people." This is a typical statement of anyone who has little knowledge of computers.

As most computer people will tell you, it is not the computer that usually "goofs" but the — "They're called people" — who program, operate or punch information that goes into it. In most cases the computer is doing only what it has been programmed to do.

When people start to stop blaming a machine that cannot defend itself and start putting the blame where it belongs — on the people who control the computer?

Wm. J. Trefethen  
Program Analyst

Maine Central Railroad  
Portland, Me.

Computerworld has been putting the blame on people for years. But the "people" referred to by the restaurant and the "people" to whom you refer are not in the same class. When a clerk makes a mistake, you usually wind up with one error. When a computer person makes one mistake, you may wind up with a million errors. Ed.

### ACM Urged to Finish Study of Squire's Bail

I am very pleased to see the article in the Sept. 16th issue about the ACM forming a study committee to look into the facts of Clark Squire's case. Certainly, it's about time the ACM began to face the problems of the day. The case of Clark Squire appears most interesting. I think that since he was a member of

the data processing community for so long we should offer full support in getting the facts of the case known.

Those of us involved in systems analysis are aware that no "system," including the court structure can be without fault. For a man to be imprisoned for 18 months on unreasonably high bail (\$50,000) without a trial appears to be a clear violation of our constitution.

I urge the ACM to complete its study rapidly, and I sincerely hope that members of the field will donate both time and money to Clark Squire's cause.

Joan Dublin

### 'Unethical' Conduct Grounds for Expulsion

Regarding an article in the Sept. 16 issue I am strongly against involvement of ACM in the case of programmer Clark Squire. I would consider this type of involvement by ACM appropriate only where professional matters are involved.

As quoted in the article, Dr. Herbert Grosch is concerned about the welfare of its members. A professional organization should be concerned about the professional welfare, but not personal welfare to this extent. Rather, ACM should consider expulsion of members (black or white) whose personal activities reflect poorly on their professional status, particularly when the back of my membership card says that members must "have attained professional stature by demonstrating intellectual competence and ethical conduct in the arts and sciences information processing."

Grosch also feels the ACM should "be devoted to more than just publishing algorithms. I couldn't agree more! As a data processing manager, I have already communicated to my fellows that ACM does not meet my professional needs at all.

My disenchantment with ACM is growing with leaps and bounds.

Charles J. Moritz

St. Louis, Mo.

### S/S's Card System

#### Can't Do Square Root

In reference to the Aug. 19 letter by Winston Brooke and the Sept. 10 letter by T.W. Douling, all System3 RPG II Compilers do not support Square Root as an allowable opcode. The card system does not.

The Disk RPG II Compiler will calculate the root of up to a 15 digit number and give a result of up to 15 digits, with or without decimal places. This is accomplished by internally expanding the squared number up to 30 digits before finding the root.

T.J. Gronk  
Assoc. Programmer

IBM Corp.  
Rochester, Minn.

### MOS Definition Is Questioned

As a fan of MOS memories, I thoroughly enjoyed "LSI Memories Making a Splash in Semiconductor Field" [CW, Sept. 23]. There was, I believe, a serious error attributed to an Intel Corp. researcher: MOS was parenthetically defined as "metallic oxide silicon" rather than "metal-oxide-semiconductor."

Donald O. Baechler, P.E.  
Silver Spring, Md.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.

## Real Leadership Needed

## A Time of Opportunity or Responsibility?

Last January there were many prognostications as to what the 1970s would mean to the computer user. It is a tempting subject for any writer who has to fill some column inches while getting through the problems of Christmas.

It is a useful subject because generally there is little research to be done. All that is needed is a bit of quickness with calculations, machine and a secretary who can transcribe the stuff.

There is even little fear of discussion afterwards. After all you are talking about what the future holds and even if you are hopelessly wrong, everyone has forgotten what you said long before the future arrives.

A different way of looking at the situation is to wait a bit and see what the seventies do provide. They can try to be in-terpreted real events and look ahead from there.

In my time I have done plenty of the prognostication of filling column inches, but at least on this occasion let us take a look at the happenings of the seventies to see what is coming.

## More Bang per Buck

Precisament among the happenings, of course, is the Series 370. The 155 and 165 were important but, even more, the 145 with its traditional architecture seems destined to be the workhorse of most of the computer installations in business.

If and when it is joined by a 135, a mass of computer users will have at their disposal systems that have much more power per dollar than they currently have available.

Nor are IBM users the only ones. The RCA announcements certainly are increasing the processing power per dollar. The Burroughs' announcement of last week followed the same trend.

It seems clear that processing power is going to be more available in the seventies than it was in the sixties. The question remains: what are we going to do with it?

## Opportunities

This may appear to be the simplest question that has been asked for years. What does one do with computing power? One computes.

One uses multiprocessing and multiprocessing to give greater throughput, to bring new applications on-line, and to carry the flag of computing power. Hundreds of computer hardware salesmen have given that pitch, and you must by now know it by heart. With this new, marvelous machine you are now able to add the new applications which you previously could not have attempted.

"The profit to your company of these experiments is liable to be much greater than the straightforward profit from computer processing of your payroll, etc. — and because of our new great power we can do both for you without (much) increasing your dollar costs."

The refrain is a magic one, and one of which the industry has been geared throughout its existence. Opportunity often moves for everybody from the operator to the company president. It is very attractive.

## What Else?

But opportunity is only one part of a whole. Patton could often see the opportunities to move his tanks forward, but Eisenhower also saw the problems that arose from the opportunities that Patton took. Eisenhower had to get the gas

oline up to pull Patton's men out of the mess they were in, as many recent filmgoers have seen. For the past 15 years computer users have been taking opportunity and rushing forward with their tanks. But this does not mean that the new power available for the 1970s should be used to push those tanks still further.

Indeed, I think that the evidence is that the new power is urgently needed elsewhere. Computers are becoming a scapegoat for almost anything. In my local paper yesterday I was reading about a welfare demonstration at Zayre's, a large department store chain (200 data processing staff).

A group representing people on welfare was asking that some payment schedule limit involved in their credit system should be changed from \$50 to \$10.

They reported that company officials had said that it would be too difficult to change the computer program and therefore the request must be rejected.

That anyone could seriously make such a statement is so difficult to change the computer program and therefore the request must be rejected. That anyone could seriously make such a statement is so difficult to change the computer program and therefore the request must be rejected.

They have been doing this sometimes without even the flimsiest technical backing. I do not know whether Zayre's uses Cobol, but I do know that a program that cannot be changed to fit in with the social needs of the time in an economic manner is a dangerous program — and that dangerous programs should be eliminated.

## New Regulations

How the social needs are going to be expressed during the seventies is not currently clear. Part of them will be expressed by new laws and new regulations. Others will be expressed by

codes of ethics. Some will be expressed by hurried management decisions in the face of demonstrations or strikes. And some, regretfully, will be expressed by careful limitations and spinning, etc. of computer input and output.

The opportunity that is given, to us by the new powerful computers at the same price is not only the opportunity for new applications, it is also the opportunity to consolidate, and to shore up the very shaky structure that we have created over the past 15 years.

Our prime duty is to ensure that we never again hear excuses like, "It is too difficult to change the program, therefore we cannot agree to your requests, even though they appear reasonable."

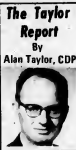
Excuses like, "The computer says so, and there is no way that we can find out what the computer really based itself on, therefore it must be considered true."

And all the other computer excuses add up to a statement that the world is to be run by the computer people for the convenience of the computer.

We can do it. The 1970s could go down in computer history as being the era when computers learned their place, through the leadership of hundreds of computer managers, senior program managers, and most of all through the leadership of data processing and information directors.

The computer could emerge into the 1980s as a highly valued and recognized servant of individuals and society, instead of a threatening dictator ready for 1984. That's a real goal for us to aim at — and now we have the power to do so.

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## Letters to the Editor

ND 812 Programmed  
For 'Interesting' Game

Some of us were amused and some not to amuse at your report on Wescon Show that "even a 10-year-old boy beat the ND 812 minicomputer at a chess game."

The ND 812 was programmed to play an "interesting game" of chess but we had no thought of teaching it to reach the championship level. After all, could we keep friends if they found themselves inferior to a set of integrated circuits?

Ralph L. Andreas, Jr.  
Vice-President, Marketing  
Nuclear Data, Inc.  
Palatine, Ill.

Little Guy Won't Be  
Able to Afford Patent

Every time I read in Computerworld how great it is that pro-

grams can be patented I lose my cool. You see, I am an "inventor." Control Data Corp. has applied for a patent on a program I wrote. Although I am named as inventor, Control Data expects all rights, title, and interest in the concepts, and I do not dare use again the ideas I thought up for fear of a lawsuit.

I believe that this will be a common result of patenting pro-

grams: the little guy will not be able to afford to patent himself, and the big guy he works for will expropriate his brainstorms.

Just think how lucky we are that Einstein did not patent relativity theory and Bach did not patent the well-tempered scale.

Will Baden  
ex-CDC

Buena Park, Calif.

When you need a General Ledger  
Corporate Financial Reporting System

(See Page 32)

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## Art Strickland

# The Solution Is a Data Bank in Reverse

With nothing to do but think lately, and a sign to remind me, I have reached some interesting conclusions.

After two weeks of "there must be an easier way to make a living," I began to think about data banks, privacy, and human rights. And I have finally solved the problem!

### Best Defense

My solution is based on the proven techniques of modern American foreign policy and a great football coach: "The best defense is a good offense."

We're worried about their having all that data on us, Right? But worse than that, we're afraid they'll tell somebody, Right? So let's get the goods on them, let's let them worry about us, tell somebody—or better yet, everybody! I propose the Data ABM (Data Against Bank Abuse).

Since we can hardly expect congressional support, I suggest that ACM undertake the Data

ABM as a top priority project. With startup financing from a nationwide fund-raising campaign, the ACM directors will do preliminary planning, hire a staff, and appoint Ralph Nader or me director.

## Viewpoint

We will hire private investigators and news clipping services to build an initial bank of compromising, slanderous, and embarrassing data on congressmen, administration officials, credit bureau managers, and other dossier collectors. Contributions from interested citizens will also be stored.

When a citizen complains he has been damaged by information from an enemy data bank, we will simply release to the wire services choice tidbits from the dossiers of his congressmen and the persons responsible for the data bank.

### A Threat

At least that will be our threat. If we maintain a strong deterrent force with the clear capability to overlook, it will never be necessary to actually use it.

This will significantly reduce our machine costs and eliminate the need to verify the data (Any way, erroneous data is better for this purpose than accurate data.)

It will be necessary to store the data in a high-speed direct access device, switchable to a nearby CPU, so the enemy knows we can attack at a moment's notice. Security will also be a cost, but there won't be too many people to clear, and I think I know where we can get a mountain cheep.

Now some may argue that the deployment of the Data ABM will lead us into an ever-expanding data race.

We would hope, however, that our strength will lead to early

disinformation talks.

As a minimum, we would expect to sign non-aggression pacts with the smaller, underdeveloped data bankers. Make no mistake about it, we will stand ready to sit down anywhere, at any time, with any enemy who has shown his willingness to negotiate fruitfully.

Since the intentions of our adversary are questionable at best, since we are already years behind, and since the balance of power is now critically uneven, the American people have no alternative.

We must develop the Capability to Surveil and Retaliate if we are to deter the information holocaust upon us!

## 'Data Capture' Rightly Named

LONDON In the U.S., a Nova, in your parking space probably would call for a parking ticket for the owner of a Chevrolet.

Here in the United Kingdom, it meant the recovery of a computer which is just starting to operate.

The Nova, Data General's first minicomputer, was found in a Handwell Street parking space by a man returning home from work. A little diligence, and the help of a British weekly computer newspaper, provided the name and phone number of the Reading office of Data General.

It was discovered that the Nova, complete with Teletype terminal, had been stolen along with a car which was rented by a company executive.

The demonstration model was returned, unharmed, and was back to work 24 hours later. The newspaper, *Computer Week*, called it a case of "data capture."

### Geography Is Output

INDIANAPOLIS, Ind. — A computer at the Medical Center of Indiana University can draw a map of Indiana with all the counties outlined and all the cities named.

The program, by Larry Jasper, contains four options. The computer can indicate an outline of the state, a map of all the counties, a map including all the cities, or a map with the cities and/or counties labeled.

The location of the cities is marked by various symbols, designating the size of the cities.

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October 21, 1979

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# Configuration Simulation Added to Hardware Monitor

By Don Levitt

**SANTA CLARA, Calif.**—Users will be able to measure how well presently installed equipment is being utilized, and to simulate proposed changes in their hardware configuration, with an expanded software package announced by Computer Synectics in support of its System Utilization Monitor (SUM).

The SUM Data Analysis Program (Sumdap) uses a magnetic tape generated by, and contained in the SUM, to provide performance reporting of the user's components. The probes attached to the SUM are said to make it useable on any main frame or any set of peripherals.

## Simulated Results

With the simulation capabilities, the user defines the proposed configuration in terms of higher or lower speeds of the new components, and actual measurement data based on those changes then produce the simulated results.

The company may also be planning to add problem software evaluation capabilities to the package. A spokesman neither confirm nor deny that the company was working in that direction. He said that he was not able to discuss the possibility.

He pointed out, however, that the user could, in effect, get problem program evaluation with the present monitor/software system used on a central processor handling one program at a time.

Users of Sumdap told CW that they were pleased with the news that simulation is being added to the basic measurement package. Several are already using separate system simulators, and they see a much simpler operation with the measurement and forecasting abilities combined in a single system.

As with the hardware measurement, the configuration simulator is said to be able to reflect the use of any CPU or any peripheral. The specific measure-

ments desired can be defined by the user in both applications.

In the SUM package, there are 16 counters. In the Sumdap package, there will be 19 software accumulators. Any of the SUM counters can be viewed while the monitoring is in progress, the company said, under operator option.

Printed configuration simulator results are provided in either numerical listings or graph formats. The user can choose to show time and percentage of use of each element being measured

with interval, intermediate or final numerical summaries.

High, low and average utilization, as well as standard deviation from the average, can be demonstrated with a statistical numerical summary.

Alternately, utilization plotted through specified time periods can be shown with interval and composite histograms, according to the company.

Sumdap can be implemented on any configuration in which the CPU supports Fortran IV. On a 360, it requires at least,

72K of storage and operates under either DOS or OS/360.

The monitor and basic software have been available for about a year and a half. The enhanced software, renamed ASumdap, including the simulator, is expected to be ready for field tests within 30 days, and be available for distribution about a month after that.

The package, including hardware monitor and enhanced software, is priced at \$35,000.

Computer Synectics Inc. is at 283 Brook Road.

## Cobol Post-Compiler Package for 360s Imbeds Diagnostics in Source Listings

**COLLEGE PARK, Md.**—A \$100 Cobol post-compiler from Dynamic Data Systems (DDS) gives 360 users program listings with diagnostic messages imbedded with the source statements, rather than isolated near

the end of the printouts.

Dynadab also allows the user to specify the level of diagnostics to be imbedded, and to control the punching of the object deck based on an error threshold.

Using Dynadab increases the machine time spent in each compilation by about two-thirds. The user uses the Dynadab post-compiler, the user assigns all outputs from the standard compiler run to tape decks. The source statements and diagnostics on the "printer" tape are sorted and then printed with each error listed directly under the statement to which it is related.

With Dynadab the user can specify options to control the level of error message printed and line spacing, along with the choice of duplication or resqueuing of source deck.

Dynadab is itself a Cobol program designed to operate within 32K bytes of storage. It requires two tape drives, a card, card reader, punch and printer.

Priced for \$100 under a license agreement, the Dynadab package includes source deck, documentation and run instructions.

Dynamic Data Systems can be contacted through P.O. Box 735, Berwyn Station.

## Library Programs Uses Sequence or Key Word Control

**BERKELEY, Calif.**—A magnetic tape or disk library monitor system is available from Computer Dynamics Inc.

AS with other library systems, the Profile/Library Update package is geared to generating, controlling and updating files of 80-character records on either tape or disk. Typically these files are source decks, object decks, test data sets and Job Control Language (JCL) specifications.

The company said that with the Profile package, the user is able to add, change or delete records at will, and to use

English language commands to perform and supervise the operations.

The company noted that the Profile system provides the user a choice of controls on the files. The records can be updated on the basis of sequence control, which is maintained by the system independent of any sequence numbers used within the files.

The alternative is a key word control, by which the user can specify, for example, that a given action should occur only

after a key word is found.

A Scan capability is also available with the Profile system by which the user can search for a series of up to 24 contiguous characters anywhere within a record, and initiate action based on whether or not the series is found.

This can be used, the company noted, as a means of allowing the user to write programs, especially Cobol, in shorthand which is then expanded through search and replace commands, into full Cobol source language before compilation.

The command structure is said to allow direct interaction with IBM's compilers once source deck and its JCL is developed to the user's satisfaction.

Designed specifically for use on 360s under JES, DOS or OS, the package requires at least 32K of core storage.

"CDI said that the package is available in object deck form for \$2,950. This price includes a user manual, but installation costs beyond a reasonable distance from Berkeley are not included, the firm said.

Computer Dynamics Inc. is at 1760 Solano Ave.

## Card Driven Inquiry Reporting System Allows Exits to User's Own Coding

**BEETHAM, Md.**—A general-purpose information management system that can be used on either the IBM 360 or RCA Spectra 70 series has been used extensively in local sites for up to a year. The Inquiry and Reporting System (IRS) is now available nationally, according to the developer, Sigma Data Computing Corp.

Sigma Data said that IRS is a parameter card driven "code and go" system written in Assembly Language. While the user normally records specifications on standard IRS coding sheets, the system allows exits from IRS to on-code Assembly or Cobol subroutines.

IRS includes the ability to select, sort, calculate and modify data on as many as 44 input files. Sigma claimed.

## Sequential Files

The company said that IRS can be used to create and maintain sequential or indexed sequential files, having fixed variable or undefined length records on

either tape or disk. Data can be in character, packed decimal or fixed-point binary format.

The retrieval of records under DOS can be based on "And Or and Not" logic. The data within records can be accessed by either start position or field name.

The system allows for the sorting of records in ascending and/or descending order, and the chaining to data from auxiliary files in the selection, sorting and output operations. Spacing and editing options are said to include floating dollar sign, zero suppression and page overflow.

Sigma said that up to 99 detail lines can be produced per record. The user may specify up to 10 levels of control, with automatic totals, counts, cumulative totals. Printouts of maximum, minimum and average values are also available. Minimum CPU configuration is 32K of storage, according to Sigma.

The purchase price of IRS is \$20,000. Purchase/payout and lease arrangements are also available, the company said.

Sigma Data Computing Corp. is at 4720 Montgomery Lane.

## GE 400s Get Quick-Draw

**PRINCETON, N.J.**—Quick-Draw, an automatic flowcharting, debugging and documentation system, is now available for the GE 400 series, from National Computer Analysts, Inc. (NCAI). The latest version of the system processes Cobol source decks, NCAI said.

The GE 400 version is available on a three-year lease plan for \$6,300. National Computer Analysts Inc. is on U.S. Route 1.

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## Programs Review Portfolios

## Interactive Data Expands Its Financial T/S Services

WALTHAM, Mass. — Interactive Data Corp. (IDC) has expanded its on-line time-sharing services for the financial industry with a refined portfolio management information service, a portfolio performance monitor, and a service that monitors and analyzes stock market transactions as they occur.

IDC has also added two more services, developed by other companies. Perspect, Inc. of New York, allows money managers to rank and compare the fundamental value of companies within an industry, industries within the total market, and pinpoint under- and over-evaluation.

## Foresight

A simulator that allows the user to test

alternative courses of action. Foresight was developed by Computer Technology Corp. of Los Angeles.

The refined portfolio management information service, Portfil, uses the IDC Financial Data Base assimilated from the New York and American Stock Exchanges and 1800 over-the-counter stocks. It is designed to allow transaction bookkeeping and report generation including appraisals of the securities within each portfolio.

The Portfolio Performance Monitor (PPM) is an addition to the Xport capabilities, through which the user can compute internal rates of return for each portfolio.

## Analyzes Transactions

Xtick, the service that monitors and

analyzes transactions as they occur, is said to have two basic uses. Because it accumulates data from current stock market tickers, on a 15-minute delay, it enables mutual fund managers to know, and enables them to report, their status very shortly after the end of the trading day.

## Mark IV Can Create IMS/360 Application Programs; Checkpoint Restart Also Added

CANOGA PARK, Calif. — Installations operating with the Mark IV File Management System will be able to start using a special Checkpoint Restart feature during the first quarter of 1971, according to the developer, Informatics Inc.

The services are available on various pricing schedules, reflecting such variables as customer's expected level of usage, prime-time vs. non-prime time connection, and basic monthly subscription charges.

Interactive Data Corporation is at 486 Totten Pond Road.

Another special feature will allow the 360-oriented Mark IV user to maintain and retrieve from Data Language/I files independently or in conjunction with IMS/360, the company said.

The checkpoint records will be generated automatically on fixed intervals of time, specified record count, or under OS/360, when an end-of-volume condition is sensed. Informatics said that the user may call for checkpoints on more than one basis.

The interface with Data Language/I files is said to allow the use of Mark IV coding to generate the application programs under IMS/360. Normally, Informatics pointed out, this would require specialized BAL or Cobol program development.

The Mark IV-DL/I interface will be available during the fourth quarter of 1970 for \$25,000 above the cost of the basic Mark IV system.

The Checkpoint Restart feature, expected early next year, is priced at \$2,000 above the basic system cost. Informatics is at 21050 Vanowen St.

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## ANS Cobol 'Altix' Saves Core, Uses One Basic Formula

RAMSEY, N.J. — An American National Standard (ANS) Cobol version of the Altix package is available from Management Information Service.

The package calculates all payroll withholding taxes using one standard formula and a table of variable factors for federal, state and city taxes.

Altix is said to permit the preparation of wage bracket withholding tables based on the user's own formula. It can also verify all individual employee tax calculations, the company said.

Implemented under either DOS or OS/360, the ANS Cobol version of Altix requires from 4K to 16K of storage, depending on the number of tax jurisdictions to be considered.

Available earlier in Cobol and BAL versions, Altix can also be run on RCA Spectra processors, the company said. Cost of the package ranges from \$475 to \$2,500, depending on the complexity of the tax structure to be handled.

Management Information Service can be contacted through P.O. Box 336 here.

**Croxtabs Adds Retrieval Capability**  
CAMBRIDGE, Mass. A retrieval capability has been added to the Croxtabs statistical analysis and reporting system so that the user can get a listing of records that form the basis of any selected segment of the report.

The modification has been implemented on the OS/360 version by the developer, Cambridge Computer Associates (CCA).

The program requires at least 120K of storage under OS/360.

Current users will receive the new system without additional charge, the company said. To others it is available for \$12,000.

Cambridge Computer Associates is at 220 Alewife Brook Parkway.

# PDP-10 Users Get Cobol Compiler From DEC

Users of the DEC PDP-10 now have a choice of two Cobol compilers for their processors. Although there are some significant differences in the packages, the choice may depend on the size of the user's machine.

DEC itself has a compiler system that is based on a 32K word configuration. It also requires at least 100,000 words of disk storage.

Available since last fall, Codon Corp.'s Cobol-10 compiler can be implemented on a 16K ma-

chine. Although users have been utilizing disk storage, Codon said this is not required by the compiler.

Both compiler systems meet Usual language specifications.

Each package includes a compiler and an operating system, and both can be used in either on-line or batch processing mode.

## Re-Entrant

Of particular interest to on-line users, the DEC compiler is re-en-

trant and, at the user's option, it can produce either re-entrant or non-reentrant object programs.

In addition to the operating system and compiler, the DEC package includes a source library maintenance system, sort/merge facility, and a test system.

The DEC system allows the user to Call Fortran or Macro subroutines, and to make use of a filing system that provides either random or sequential data management capabilities.

Codon's Cobol-10 has a library facility for inserting source language routines into a program via the verb COPY.

In addition, Macro-10 Assembly Language routines may be written into a Cobol program using the verb ENTER. This package can also handle either

random or sequential files, the company said.

Codon Corp. said that its compiler is available on a 12-month lease/purchase arrangement for \$1000/mo. through the company offices at 400 Totten Pond Road, Waltham, Mass.

DEC said that its package is being distributed without cost to PDP-10 users.

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## Accounts Payable Service Is For T/S or Remote Batch

LOS ANGELES — Accounts payable processing can be handled on either a time-sharing or a remote batch basis, with a system developed by URS, San Mateo, Calif., and available through the Remote Computing Corp. (RCC).

The system can generate cash requirements and cash distribution reports, a weekly commitment register, weekly and monthly distribution reports.

In effect, the user can run any time during the day he wishes; RCC sets up his files at the beginning of the day and leaves them available all day.

The user is subject to a \$100 monthly charge, regardless of level of activity, under the scheduled plan. In addition, he will be charged \$36/thousand line items entered, and \$10/100 checks printed at the user's terminal, and \$13/thousand master files items/mo maintained by RCC.

## Package Controls Freight Loadings

NEW YORK — Demurrage charges, the cost of keeping an empty freight car standing by, can be reduced by using the Freight Car Demurrage (FCD) control system, according to Datasatronics, Inc.

Developed by Computer Generation Inc., FCD is said to virtually eliminate clerical costs and end-of-month demurrage bill reconciliation.

Written in Cobol, FCD operates under DOS/360. It requires 32K of core and a disk.

Datasatronics Inc., at 663 Fifth Avenue, said that FCD is available under a perpetual lease for \$5,000.

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## Sure, the Sycor 340 data communication system gives you clean source data capture.



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Entry by electronic keyboard onto magnetic tape cassettes permits data to be recorded about 30 per cent faster than it would be electromechanically. Sycor 340's unique automatic paging option handles even long or complicated forms by accepting them in small segments, or pages, easily scanned. Then, it automatically displays page after page of labels and field control characters, easy for the operator to follow. And (hallelujah!) no cards, no paper tape to mess with. Just compact cassettes that hold the equivalent of 1400 punch cards. Easy to load and to store. Thriftily re-useable. You can interface the 340 with the Sycor printer and get all the versatility of high priced line printers. Use multipart, continuous, pre-printed forms for a host of applications.

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Two 10-digit accumulators—a Sycor first, by the way—generate totals or subtotals detecting keying errors in keying or verifying.

Other error detection features include visual proof-reading from the CRT, programmed entry, format field and character checking, and check digit verification. Add and subtract operations give you automatic total and subtotal field computation and entry without re-keying on an adding machine. Result? Clean-tape output—at the data source—that cuts delays and confusion, dramatically lowers mainframe processing costs.

But data capture is only a part of what you really want a terminal system to do for you. In the Sycor's modular system can be configured for batch communication, via the voice-grade public telephone network, for attended or lower-cost unattended operation. Sycor's binary synchronous procedures, with automatic retransmission that provides automatic error detection, and speeds of 1200, 2000 and 2400 baud, are compatible with S/360 hardware and software. You can set up an on-line system that gives you the advantages, but none of the complexities, of teleprocessing, by using the Sycor 610 Communication Converter Station at your central office to record on, or transmit from, computer compatible magnetic tape. That's another part, right?

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SYCOR INC

# FCC Gives Green Light to WU Datacom Tariff Rates

WASHINGTON, D.C. — Western Union's Datacom tariff was given a green light here by the FCC when it denied a petition from Microwave Communications Inc. (MCI) that objected to the proposed private-line service.

Datacom provides a facility for private use of a data channel between any two or three of 45 large cities on an around-the-clock basis.

Customers in any part of the country may gain access to the service through leased private wire to the nearest Datacom city, with the new tariff rates applying to transmission between service cities. The commission said that Datacom will offer an optional service that may prove beneficial in meeting the users' needs.

MCI had contended that Datacom will put a financial burden on Western Union, that it will divert business from TWX and Telex, and that the service violates a condition of AT&T's blanket construction authorization.

MCI argued further that Western Union had made no comprehensive market study and that its revenue requirement showing was insufficient.

The commission said it could not agree with MCI's contention.

It said that the only item of additional investment would be the multiplex equipment which will not be purchased and installed until a revenue producing customer is obtained, and that diversion from TWX and Telex would probably be "minimal" since they are both switched message services, and Datacom is a point-to-point private line type service.

Without deciding whether AT&T service, if it were to be offered by AT&T would violate the condition of its blanket authorization for the offering of a new classification of service, the commission said no similar conditions have as yet been imposed on Western Union, and that at the time of its next blanket application consideration would be given to whether

such conditions should be imposed.

While a comprehensive market survey is desirable when a new service is being introduced, the commission said the offering of Datacom presented a different situation, and that since the only new investment involved relates to the multiplex equipment, market information is not essential. It noted that Western Union has made certain market estimates which

are adequate under these circumstances. Stating that it did not understand MCI's statement that "a customer ordering both a Datacom line with multiplexing would pay less than if multiplexing equipment were ordered separately," the commission said that if this means that there is a reduction in line charges if Datacom service is taken as a package, then its reading of the tariff "is to the contrary."

## Specialized Carriers Needed To Render Proposed Services

WASHINGTON, D.C. — Noting that the present carriers "have not demonstrated the administrative ingenuity to permit technological advances," the Association of Data Processing Service Organizations (Adapso) has told the Federal Communications Commission that there is a

need for the services proposed by the specialized common carriers.

Responding to the FCC's request for comments on the policies and procedures of the commission with regard to granting the applications of the specialized carriers, Adapso said it believed the new competitive carriers would be motivated to provide contemporary adaptable state-of-the-art transmission facilities.

In addition to allowing the new forms of service, the FCC should, in Adapso's view, require all communications common carriers to establish proper tariff specifications on quality of service.

## Communications

Adapso described the optimum national communications network as one that gives the user the maximum choices of carrier or combinations of carriers in effecting a transmission. Thus the specialized carriers should be encouraged to establish local distribution facilities and to provide for interconnection with the present common carrier networks.

## Teleswitcher Usable As Network Front-End

DALLAS — The Teleswitcher Data Control 5000 can operate as a stand-alone message switcher or as a switcher or as a communications front-end for a computer-based network, according to Computer Control Systems (CCS).

The Data Control 5000 can be used with various input devices and can handle a variety of data transmission speeds, a company spokesman said.

There is no limit on the number of terminals that can be supported by the 5000, the company said. As a user's network expands, more units can be made available.

To implement its use as a communications front-end, the 5000 will shortly be available with a 360 interface.

The Data Control has a basic price of \$100,000 which provides the stand-alone switcher capability and one port to a CPU.

Computer Control Systems is at 13740 Gamma Road.

## Modem Uses DDD Net

ACTON, Mass. — A modem designed for high-speed digital data transfer over the Direct Distance Dial (DDD) network is available from Bowman/All Inc.

Operating at 2,400 bits/sec, the 6000A is said to utilize the DDD capability and minimize on-line time. The modem utilizes the Data Access Arrangement recently initiated by the telephone company and will completely eliminate the need for costly leased lines, according to Bowman/All.

Provisions have been built in to accommodate special I/O devices such as Teletype Switch Closure and RS-232C.

Price of a 6000A is \$1,250. The company is at 531 Main St.



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October 21, 1970

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# Off-Line Printer System Allows Tape and Disk Input

By Frank Piacit

**LOS ANGELES**—Called the first computer-controlled off-line printing system using the IBM 1403, the Dataprint from Computer Machinery Corp. (CMC) allows input from either tape or disk.

An off-line printing system, the company said, "will allow the user with a large volume of printout to save mainframe time by taking the printout load off the computer, allowing it to be used for computing."

The Dataprint processor is a general-purpose computer, with up to 65,000 bytes, console teletype and print controller to interface with the IBM printer. The print system can operate with two 1,100 line/min 1403s, four tape units and/or four disk drives of either the 2311 or

2314 type.

Features which are said to contribute to the flexibility and versatility of Dataprint include its ability to accept media containing any blocking factor as well as any block size.

It provides for selective printing through the use of key fields within records, and can accept

any code and process it internally.

The Dataprint controller, compatible with most IBM 1403 models, accommodates any chain or train configuration and provides for actuator checking as a standard feature, the company said.

All Dataprint operations and

functions are initiated and monitored by the operator.

An operator's control panel furnishes facilities for power control, initialization and a status display while the teletype printer provides for communicating with the system.

Initial deliveries of the tape systems are scheduled for Jan-

uary 1971. Disk systems will be delivered in April. Excluding the IBM 1403, a Dataprint tape system leases for approximately \$1,165/mo; a tape system capable of operating two IBM printers leases for about \$1,850/mo.

Computer Machinery Corp. is at 2231 S. Barrington Ave.

## Minis, Midis Can Use Dual Cartridge Unit

**OAK RIDGE, Tenn.**—Tenneco Systems, Inc., has developed a cartridge-loaded magnetic tape unit for mini and midi computers.

Currently, interfaces are available for the DEC PDP-8 family, PDP-9, PDP-11, PDP-11 family, and PDP-15; Hewlett-Packard models 2114 through 2116;

Varian 620/5 and Data General Nova and Supernova. Under development are interfaces for the Honeywell H316 and H516.

The TP-1372 Doubledeck features an integrated circuit control unit which performs timing, byte assembly and motion delays by means of self-contained logic circuits.

The transport mechanism is retractable, and, in addition, automatic track select, dual transport capability and phase encoding are now standard features.

With the software-controlled track select feature, the dual transport system performs assembly and updating operations quickly. The total capacity of the system is 512K words.

Normal operation is via the "program interrupt" feature, one byte at a time.

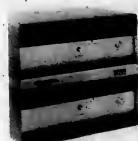
Searching for beginning of tape (BOT) on either of both transports may be started by the program, and it will then automatically continue.

These features are said to make the TP-1372 particularly suitable for real-time operations where several real-time devices are competing for computer time.

Other possible applications could include the updating of master files, sorting and merging of small data files, tape duplication and performing program assemblies.

The Doubledeck could also find use in producing duplicate tapes simultaneously and in the production of tape copies.

The TP-1372 Doubledeck includes a single controller, two



Tenneco's Doubledeck Tape Cassette Drive

transports, software, and an interface. Prices range from \$3,590 to \$3,790, depending on the interface. Deliveries are scheduled to begin in November, 1970.

Tenneco Systems, Inc. is at 795 Oak Ridge Turnpike.

## Data 100 Terminal Has Built-In Mini, May Be Used to Replace IBM 2780 Unit

**MINNEAPOLIS**—A series of programmable terminals that can be used to replace either the IBM 2780 terminal or a 360/20 dedicated to communications work has been developed by the Data 100 Corp.

Called the 78 Series, it is said to provide the user with flexibility in the selection of peripheral I/O devices.

The basic terminal controller, has a Micro Systems minicom-

puter with an 8K-instruction set. Core memory, with a cycle time of 1.1  $\mu$ sec, consists of 4K eight-bit words which is expandable in 4K increments to 32K. It is also equipped with 512 16-bit words of 220 nsec read-only storage containing the terminal's microprogramming.

The basic configuration of the terminal includes a 300 cpm/min reader, 300 line/min printer with 6 or 8 line/in. and vertical for-

mat control, and an 8K processor.

Standard options include 4,800 b/sec transmission capability, automatic answer/disconnect, Ebcid transparency, data compression/decompression, extended retry, multiport line control, print line expansion to 132 columns, 400 line/min printer and up to 10,000 characters of I/O storage.

The terminal's software package includes an executive, synchronous or asynchronous communications control, and the required peripheral equipment drivers. In addition, local processing capabilities are offered for a variety of utility functions, editing, or diagnostics.

Up to 11 peripheral units can be driven by the 78 Series controller, including IBM 360 compatible tape drives, CRT display units, teletypewriters and paper tape equipment.

Purchase price of the 78-1, compatible with the IBM 2780, and of the 78-2, designed to replace the dedicated 360/20, is \$44,000. This includes software and the peripherals included in the basic configuration. Lease rates start at \$1,169/mo including maintenance.

Delivery of the 78 Series will begin in December 1970. Delivery time upon receipt of order is 150 days. The company said. Data 100 Corp. is at 7450 France Ave. South.



Dyro Digital Cassette Tape Checker

threshold is adjustable from 25% to 75% of the normal output.

Error counts are accumulated for each track individually. The counts are compared with a pre-settable limit on po/no-go basis.

The Dyro digital cassette tape checker is priced at \$1,775 and is currently available.

Dyro Corp. is at 63 Tec St.

## Cassette Tape Checker Could Save User Money

**HICKSVILLE, N.Y.**—A digital cassette tape checker, that may enable users to reduce costs and insure cassette reliability, is being produced by Dyro Corp.

Known as the Dyro Model TC 1000, the unit automatically checks the performance quality of digital tape cassettes. The only required operator function, the company explained, is load/start.

The Digital Cassette Tape

Checker, the company said, eliminates buying the most expensive tapes and hoping for the best, or checking cassettes the hard way — by processing data and looking for errors.

For writing and reading during check, the tape is driven via a capstan and pinch roller with the head and tape in contact at a speed of 7.5 or 15 in./sec. The tape rate is adjustable from 500 Hz to 10 KHz. At 75 in./sec, a frequency of 10 KHz produces a density of 1,330 bit/in. on each track. The error

## XDS Cuts Prices On Mini Options

**EL SEGUNDO, Calif.**—Xerox Data Systems has reduced the prices of its minicomputer memory options by about 15%.

A memory expansion module for the XDS CF16 minicomputer has been reduced in price from \$4,850 to \$4,000. The module expands memory from the basic 4K words to 8K words.

A chassis to house optional memory greater than 8K words has been reduced in price from \$1,100 to \$750. Xerox said similar reductions have been instituted for additional add-on memory modules and chassis.

XDS is at 710 S. Aviation Blvd.

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**GENERAL  ELECTRIC**



GE'S NEW 9600 BPS SHORT-HAUL MODEM

# Three Vernitron Terminals Stress Communications

FARMINGDALE, N.Y. — Three portable audio response terminals, a modular video terminal display that can use ordinary television sets and a sound-insulated TTY-compatible terminal have been developed by Vernitron Corp.'s Data Devices Division.

The audio response terminals, called the VTT-1, VTT-2, and VTT-3 Tone Terminals are designed for use with voice response data systems and are portable for remote access to CPU sites.

The VDT-7 is a transportable, acoustically coupled, multivideo display data terminal. The Model 40 has a capacity of 800 characters in a 40 by 20 format and will drive any standard home television set or display monitor, the firm said.

The Model 72 has a 72 by 20-character format and requires a larger monitor display capacity.

The VDT-3 terminal runs, the company said, with 90% less noise than a standard Teletype terminal, due to its sound deadening insulation.

The three Tone Terminals can operate from rechargeable batteries. Data is transmitted over voice-grade telephone lines via acoustic coupling or, on the VTT-2 and VTT-3, via a Bell DAA device.

Another option available on the two models is a self-contained magnetic tape cassette recorder/player for recoding of data transactions. Standard Philips-type cassettes are used.

The VTT-1 terminal features 16-key input. The standard keyboard has 10 numerics and six control keys. Voice response is heard through the telephone handset.

The VTT-2 has amplifier circuits and a speaker/earphone combination that permits hands-free operation.

The VTT-3 is a full alphanumeric terminal with 61/63 input keys. The keyboard is available in several standard layouts or customized for specific applications. Speaker and personal earphone are standard.

The time-slotted "2 of 8" transmission code is compatible with the IBM 7770 and other more advanced audio response units. A "3 of 14" code is also available on VTT-3s with DAA mode.

The VDT-7s LSI MOS memory allows editing and formatting of a message or program either before it is transmitted or after it is received from a computer.

Errors in composed messages can be corrected on screen before transmission to ensure accuracy. Also, messages can be composed in local mode and transmitted at higher rates to reduce data transmission costs.

The CRT terminals include as standard equipment full/half duplex transmission, local/remote operation, middle horizontal tab, variable data rate (10, 15, 30 char/sec), and page roll/page scroll motion. Character set is 64 Ascii characters, with upper case alphabets and numerics.

The Silent VDT-3 is a mobile terminal. It communicates with a computer over ordinary voice grade telephone lines via an acoustic coupler.

The teletypewriter is TTY-type with 96 Uppercase characters.

The Model 72 of the VDT-7 display

data terminal is priced at \$3,650. It is available on a three-year lease, including maintenance, for \$146/mo.

The Model 40 is priced at \$3,400, with a three-year lease price of \$137/mo, also including maintenance.

The company pointed out that these prices do not include the TV monitor or set, which would be supplied by the customer. Both models are currently available on a two-week delivery schedule.

Prices for the VTT terminals range from under \$200 for the VTT-1 to \$500/\$600 for the VTT-3, including options. Delivery schedules were not available.

The silent teletypewriter VDT-3 is available on a one-month lease for \$90, a one-year lease at \$80/mo, and other plans. The purchase price of the unit is \$2,000. It is currently available from stock.

The Data Devices Division of Vernitron Corp. is at 176 Central Ave.

## d29 Card Punch IBM-Compatible, Interfaces Mini

PALO ALTO, Calif. — Datonic Rental Corp.'s Model d29 Card Punch is an IBM-compatible keypunch which can be interfaced with a minicomputer as a card punch/reader.

Datonic will make up interfaces to match the requirements of minicomputer products such as the Victor 800 Series, the Hewlett-Packard 2114, and others.

The d29 features operator familiarity in design, operation and appearance. The machine also features solid-state circuitry with fewer moving parts, which the company said minimizes downtime and service requirements.

Full 64-character print and non-print models are available. Optional features include automatic left zero insertion, high-speed skip, interpreting, special character arrangements and many other optional or custom features.

Price of the Model d29 ranges from \$1,962 to \$5,000. Maintenance costs vary from \$24.10/mo to \$27.68/mo. The machines are also available on a lease basis at prices ranging from \$50.35/mo to \$105.45/mo, including maintenance. Most models are currently available on a 30-day delivery schedule.

The Datonic Rental Corp. is at 1052 E. Meadow Circle.

## Calcomp 745 Plotter Was Stand-Alone Unit, Now Interfaces 1130

ANAHEIM, Calif. — The Calcomp 745 Plotter is now offered with an interface to adapt it to the IBM 1130. Previously, the 745 was available for use with the Calcomp Model 900 controller.

The Model 745, according to Calcomp, provides a maximum drafting area of 45 in. by 69 in., using four pens; or 45 in. by 58.4 in., using eight pens. Maximum drafting speed on an x-y is 180 in./min and 255 in./min, diagonally, according to Calcomp.

The 1130/745 interface and software are priced at \$15,000 and the Model 745 at \$69,000, including a one-year service contract. Delivery time is 90 days.

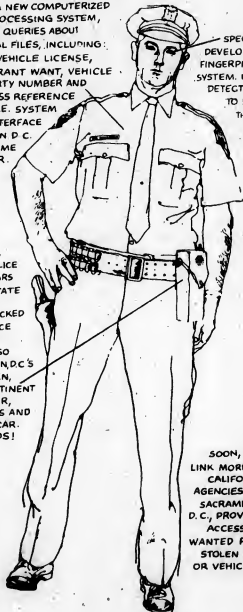
California Computer Products (Calcomp) is at 2411 W. La Palma Ave.

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## CRT Terminal Is Tied to PDP-8

SOMERS POINT, N.J. — A 1,920-character data display terminal from Atlantic Technology is compatible with the DEC PDP-8 minicomputer.

A version of the company's ATC 2000, the terminal features cursor stroke character generation with upper and lower case.

The standard PDP-8 interface uses the CPU's I/O bus, either positive or negative, and requires no additional hardware, according to the company. An option allows use of the terminal at a remote location.

The 1,920-character display is priced at \$8,630; a 960 character display at \$6,900.

Both units have 60- to 90-day delivery schedules.

Atlantic Technology Corp. is at 7th St. and New Hampshire Ave.



ATC 2000 Data Display Terminal

## Display Accepts Alphameric Data

LOS ANGELES — A Western Data Products multi-purpose data terminal for use in applications requiring on-line alphanumeric data entry is described as being flexible and easy to operate.

The Model 1070 interactive data terminal is designed for use in man-machine applications including medical data entry, inventory and revenue control, and data collection.

### 256 Character Buffer

Features of the terminal include a 256 character buffer with data storage of up to 16 characters on 16 lines of information, any one of which can be addressed at any time, the firm said.

Contents are displayed on a 5 by 7 dot matrix display with full editing features. The 1070 transmits in ASCII code at 10 char/sec and fills the gap between simple units which read only bar coded information and CRT displays, according to the company.

The selling price of the terminal is \$1,000.

Available options include Touch-Tone voice answerback communications, a 32 character and a two-line 64-character display panel.

Additional options include a magnetic



Western Data Model 1070 Terminal card reader for entering repetitive data, a cassette recorder with 10,000 characters for applications in which data can be called up rather than entered interactively and a strip printer or page printer.

The price of the Model 1070 with options is about \$3,000 in quantities of 100, the company said.

The Model 1070 is available currently on a 90-day delivery schedule.

Western Data Products is at 2321 Pontius Ave.

## Portable Keypunch Has Print Option

OLD GREENWICH, Conn. — A portable electric keypunch from Varifab, Inc., can print and punch data on a variety of input documents at the source of data, Varifab said.

Available in two models — the 401, which has no printing capability and the 402, which can print — the Vari-Punch units are intended for the handling of numerical data. Alpha data is punched and printed as a combination of numeric and one characters.

Single standard tab cards, multiple-part card sets, aperture cards, and plastic badges up to .025 in. can be accommodated.

The Vari-Punch can be located and used wherever data is collected. In the computer room, it could be used as an inexpensive device to remake damaged cards.

The non-printing Model 401 is priced at \$675, while the printing version costs \$795. Both models are currently available on a 30-day delivery schedule.

Varifab, Inc. is at 1700 E. Putnam Ave.

## Terminals Can Be Upgraded in Field

SALT LAKE CITY — A line of Beehive CRT alphanumeric terminals featuring unitized construction can have capabilities expanded in the user's office, according to the manufacturer.

The Beehive models I, II and IIF can have their 800-character display changed to 1,600 characters or the basic serial I/O capability changed to parallel.

Printer adapters, cassette adapters, and stand-alone cassette units are other options that can be added.

All three of the Beehive terminals provide, the company said, the functional capabilities required of an alphanumeric CRT display unit, and when an RS 232B type interface is used, are plug-to-plug compatible with Teletype models 33 and 35.

In addition, Model III has features that the company said enable it to be used in a time-sharing environment.

A standard Model I is priced at \$2,547, with all options extra.

Beehive Electrotech Inc. is at 1473 S. West.

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## FJCC Includes Survey Session to Provide Insight Into Current Industry Trends and Developments

HOUSTON, Texas — A special, in-depth survey session will be presented as part of the Fall Joint Computer Conference in Houston, Nov. 17-19. The session, to be held on the afternoon of Nov. 17 and all day on Nov. 18, will feature six computer professionals who will explore current industry trends and expected new developments.

The special session was arranged "as part of the conference technical program to allow specialists in the computer field to keep abreast of developments in related areas, and to provide others in attendance with an industry overview," according to Prof. Robert A. Sibley Jr., conference general chairman.

The survey session will be held in the

Ballroom of the Astroworld Hotel, directly across from the Astorhall. Presentations will be informal, and will not be included in the conference proceedings nor will they be available in other published form.

Among the topics to be discussed are: pitfalls of automatic computation, or why a math book isn't enough; data management for the uninitiated; and multiprogramming systems design and operation — current and future.

Others are: the payoff from system's performance analysis; IBM — people in computing or a humanist's view of data processing; and system architecture in the LSI era.

Prof. Sibley said: "Every effort will be made to assure that the session is as relevant as possible in keeping with our conference theme of 'systems and society.'"

## Contracts Seminars

NEW YORK — The question of contract protection for users has become such a significant and imposing one that orientation seminars are being planned for management personnel.

The American Management Association will conduct two such seminars next month, one here and another in Chicago. Both meetings will run for three days.

The New York seminar, Nov. 11-13, will deal almost entirely with the various aspects of contracts for computers and EDP support services, including lease arrangements with unbundled manufacturers, proprietary software, and special problems.

The Chicago meeting, Nov. 18-20, will deal mainly with facility management.

Information is available from the American Management Association, AMA Building, 135 West 50th St., New York, N.Y. 10020.

## DPSA I/O Seminar Begins Oct. 26

STAMFORD, Conn. — The Baulston-Plaza Hotel in New York City will be the site of the Input/Output Systems Seminar/70 sponsored by the Data Processing Supplies Association (DPSA) Oct. 26-28. Presentations by major peripherals manufacturers will illustrate a broad range of

DPSA President, John H. Dunham, will open the seminar with an "Introduction to DPSA."

DPSA nonmembers will pay a \$150 registration fee which can be applied to DPSA membership. More information can be obtained from the Data Processing Supplies Association, P.O. Box 1333, Stamford, Conn. 06904.

## Societies

new developments in hardware and applications. The presentations will stress the total systems concept by utilizing the "case history" approach to data handling.

### Keynote Address

Will B. Rodemann, vice-president, marketing, The Standard Register Co., will give the keynote address on "The Fourth Generation: What Will It Mean?"

The program will range from OCR/OMR through perforator tape systems and electronic storage media.

## Cast '70 Conferences To Include Exhibits And Technical Panels

MIAMI — Over 500 managers and engineers are expected to attend the Computer Applications and Systems Technology Conference (Cast '70) here Nov. 12-13 cosponsored by the American Institute of Industrial Engineers (AIIE) Miami Chapter and the Computer and Information Systems Division of AIIE. The meeting will emphasize the theme of Computer Applications and Systems Technology in the '70s.

The program will combine a mix of 24 technical sessions and exhibits covering applications of computer technology and information systems in business and industry, transportation and government. General conference chairman is James N. Salapatas of the Florida Power and Light Co.

Additional information may be obtained from the Director of Registrations, AIIE Cast '70 Conference, P.O. Box 1081 Miami, Fla. 33148.

## Calendar

Oct. 26-28, Washington, D.C. — 1970: Forum of Control Data Users (Focus) Regional Conference. Contact: William Rabkin, Focus Exec. Sec., c/o Itel Corp., 10 Maguire Rd., Lexington, Mass. 02173.

Oct. 26-29, Philadelphia — 25th Annual ISA Conference & Exhibit. Contact: Philip N. Meade, Instrument Society of America, 400 Stanwix St., Pittsburgh, Pa. 15222.

Oct. 28-30, Chicago — AMA briefing session, "Catastrophe Prevention Management of the Computer Complex." Contact: American Management Assoc., 135 W. 50th St., New York, N.Y. 10020.

Nov. 4-7, Boston — Northeast Electronics Research & Engineering Meeting (Nerem). Contact: IEEE Boston Office, 31 Channing St., Newton, Mass. 02138.

## Western Airlines goes first class



## Only the Final Score Will Tell

Computers can play programmers' games on computers, but not on the ball field.

A case in point is the Iowa State coaching staff, which uses computers to analyze tendencies of opposing teams, in order to have a full week to establish defensive and offensive tactics for the Saturday games.

A keypunch operator and a programmer work on Sundays to prepare the enemy's analysis, and a 25-30 page report is ready for varsity football coach Johnny Majors first thing Monday morning. The analyses are usually prepared from at least three game reports by Iowa State scouts.

Ray Greene is head of the scouting department, as well as freshman football coach. He noted, "You play football on tendencies. You change your formation but your personnel doesn't change."

The idea is to get more accurate tendencies by using computers to analyze games. Greene said the results are sometimes surprising, even after watching films, or seeing a game in person.

He noted one or two long runs do not make a ball carrier an outstanding player, necessarily. "You find out that another back has been gaining four or five yards every crack. Really, you can't get an accurate picture until you look at the whole report."

## More Politicians Are Utilizing Computers For Assistance in Fund-Raising, Mailing

WASHINGTON, D.C. — Political aspirants have been hesitant to make the use, or misuse of computers an issue in the current campaigns, although an increasing number are turning to the machine for campaign assistance.

With the primaries out of the way, the halfway point has been reached, and many astute campaign managers have turned to computer companies for help in gaining the spoils of the November battle.

A common lament among all candidates is the ever-present need to raise money, and several prominent candidates have used computers for fund-raising help this year.

In the Ohio race for Senate, Republican Bob Taft's campaign managers have contracted with Computer Marketing Industries (CMI) for both direct-mail advertising and fund raising.

CMI's computers are used to analyze hundreds of thousands of names to determine those most sympathetic to a candidate's cause.

In this case, said Ed Bremer, CMI's marketing

manager, the company is asking "known political contributors across the entire U.S. to support the Taft campaign."

The appeal in this instance is Taft's "probability of winning another Republican seat in the Senate." Bremer said, adding that "politicians are predicting six new Senate seats for the Republicans in this election." Seven are needed for GOP control of the Senate.

### Michigan Campaign

A similar campaign is being conducted for Lenore Romney, wife of former Michigan Gov. George Romney who is now the head of the federal department of Housing and Urban Development.

Mrs. Romney is seeking the Republican vote for Senate in Michigan, and reportedly plans to use CMI for the direct-mail and fund-raising applications currently performed for Taft.

Although he would give no specific figures, citing "client privacy" as the reason, Bremer said, "such campaigns have proven immensely successful in terms of the percentage of positive responses in a given mailing."

A prime reason for this, according to CMI, is the company's ability to properly analyze statistical data produced by the computer, and the constant refinement of historical data associated with each name and address maintained by the computer.

## Toronto Traffic System Uses Its DP Backup Unit

TORONTO — Man, machine, or mixture, computer backup has proven its worth in this city's traffic control system.

Recently, 10 breakdowns were recorded in a six-month period, with a "faulty transistor" being blamed for one two-hour breakdown.

Conventional control for the 800 traffic lights is implemented automatically, while a printed message pinpoints the trouble for the engineers.

In one case in August, a cigarette held by a man installing ceiling tile tripped a fire alarm, shutting down the computer in the process.

In another instance last summer, a leak in an air conditioning unit flooded the computer center, causing another breakdown. In all cases, local control was utilized to avoid traffic jams.

Local sources indicated that extra patrolmen had to be used in cases where the breakdown would affect rush-hour traffic, but the conventional local control sufficed in the other cases.

The \$3.5 million Univac 1107 system was installed in 1964, and is inspected weekly by Univac, according to a city spokesman.

## Why Do The Sockeyes Go Where They Do?

SEATTLE — Two research projects being conducted by the Department of Interior's Bureau of Commercial Fisheries (BCF) are using small computers in oceanographic and fisheries research in the North Pacific Ocean.

Bureau scientists are seeking to determine why sockeye salmon locate where they do in the ocean, and the ocean distribution of fish of Canadian, North American, and Asian origin.

A project of assessing the effects of the oceanographic environment uses two small computers aboard the bureau's research vessels: the RV George R. Kelez, a 185-ft ship that operates mainly in the gulf of Alaska, and the RV Miller Freeman, a 215-ft vessel that conducts research up and down the Pacific Coast.

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# ACM Appoints Committee to Investigate Squire Case

NEW YORK — The ACM has appointed Kenneth King, director of the Columbia University Computer Center, to head the investigation into the case of a jailed black programmer. But there is a disagreement as to the purpose of the investigation. Clark Squire, one of 21 Black Panthers charged with a bombing conspiracy, went on trial three weeks ago. Squire has been in jail since his arrest 18 months ago because he has been unable to post \$50,000 bail.

The ACM became involved at ACM '70, when Computer People for Peace distributed information about Squire and collected money toward his bail.

ACM Council member Herbert R.J. Grosch asked ACM President Walter Carlson to appoint a committee to investigate the

case. "I asked for the committee," Grosch declared, "because here is a member of our guild who may be mistreated."

"We must consider the welfare of all members of our guild, without consideration of color and politics,"

Carlson also declared that the ACM was interested in the Squire case only because the issue was raised at an ACM-run public meeting.

"Our main responsibility is to the people who attended ACM '70' to verify the facts presented there," Carlson explained. Carlson also declared that if the Squire case had not been raised at a public meeting, "I am sure we would have no interest in it," and he stressed that the ACM Council will take no action and no stand on the case.

After King was appointed by

Carlson, he selected the two other members: Monro Newborn, a professor at Columbia, and Andrew Cooper, from the New York City Housing Development Agency. Cooper is the only black on the group. Gordon Smith, ACM executive director, will serve as ex-officio member.

## No Recommendations

The King committee will make a final report to the ACM Council at the Fall Joint Computer Conference. The ACM Council then may issue a public statement on the facts.

King said the committee will not make recommendations but will merely try to determine the facts and to present the opinions of various interest groups.

He said he expects to contact Squire's attorney, the district

attorney, the American Civil Liberties Union, and others.

## Raise \$4,000

Computer People for Peace and the affiliated Squire Committee have raised \$4,000 toward Squire's bail. Due to the depressed bond market, the group needs only \$20,000 because a \$50,000 state bond can be purchased for that price.

chased for that price.

## Squire Issues Statement

Squire, in thanking contributors to the fund, also urged black computer professionals to "move from your position of aloofness and alienation from the black community and exert a special effort to make your skills available to that community."

## They Become Sterile!

# Today Lizards, Tomorrow...

JACKASS FLATS, Nev. — Using a 360/91 specially adapted for counting sterile leopard lizards, UCLA scientists have discovered what happens to female leopard lizards when they are irradiated with radioactive cesium.

They become sterile!

The study, conducted by the UCLA Laboratory of Nuclear Medicine and Radiation

by the UCLA Laboratory of Nuclear Medicine under an AEC grant, involved subjecting a 20-acre area of sandy desert scrub to a cesium source emitting low-level gamma rays.

Supervisor of reptile studies for the project, Dr. Frederick B. Turner, said that after being exposed to about 1,500 units of radiation over a three-year period female leopard lizards in the test site "lacked ovaries" and had highly increased amounts of body fat.

He noted that another species of lizard in the area, the side-blotched lizard, survived without ill effects. Turner said the difference "may be due to the much shorter lifespan of the lizard, which rarely survives longer than two years."



Leopard lizards exposed to radiation in Nevada desert experiment looks none the worse for wear.

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## Professor in Threat At NYU Is Dismissed

NEW YORK — A history professor at New York University, indicted for an alleged threat to destroy the NYU computer center, has been dismissed for disruptive conduct in an unrelated event.

Dr. Robert D. Wolfe, an untenured assistant professor, was dismissed for allegedly disrupting a faculty meeting April 2 and for allegedly interfering with a security guard during a student demonstration April 22.

The reported threat occurred last May, and was linked to a student takeover of the NYU computer center, an attempt to extort NYU officials to provide bail for one of 13 jailed Black Panthers [CW, Aug. 12].

The extortion and destruction both failed to materialize.

## Group Wants Faster Horses

MUNICH — The Holstein Horse-Breeding Association plans to consult a computer before breeding horses. Information pertaining to breeding and racing results will be fed into the computer to match the ideal mare and stallion.

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Attn: Director of Marketing**Noisy Muffler  
Betrays Convict**

WASHINGTON, D.C. - A defective muffler helped recover a stolen truck and an escaped convict last summer, thanks to the FBI's National Crime Information Center.

The truck was recovered in Connecticut, only two days after being reported stolen in Florida, according to the FBI. The truck had been stopped in the early morning hours because of a defective muffler, and the standard NCIC check revealed that it was stolen.

A routine check of the 14 riders in the truck revealed one to be an escaped prisoner from a federal prison in West Virginia.

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Page 33

## New Management Unit Urged

# Defense Panel Calls for Revamping Computer Setup

By Michael H. Blake Jr.,  
CW Washington Bureau  
WASHINGTON — Establishment of an Office of Computer Systems and Services at the Assistant Secretary of Defense level which would be responsible for the provision of all data processing support for military departments and other DoD components through a computer/communications network has been recommended by a special ADP study group of the Blue Ribbon Defense Panel (Fitzhugh group).

The recommendation is one of a number of far-reaching proposals for a revamp of the defense DP setup made in the previously-unreleased report. The study was conducted by two independent analysts, John

P. Malbrain of North American Rockwell and David B. Breedon of Westinghouse. Although all of the findings have not necessarily been endorsed by the panel, the report was considered sufficiently important to top-management personnel of DoD to be included as an appendix to the official report, the panel said.

Other major recommendations in the study include:

- Assigning to the above-mentioned office all general-purpose computer equipment currently installed within the military departments and other DoD components;

- Assignment to the office of the responsibility for coordinating applications effort, supplying technical support to DoD com-

ponents, and establishing appropriate policies and common data formats to this end.

- Giving the office responsibility for DoD's interface with the Office of Management and Budget, General Services Administration, General Accounting Office and National Bureau of Standards in the area of data processing; and

- Establishment of a data processing industrial fund for the purpose of purchasing and leasing equipment, system software, related telecommunications, and equipment maintenance.

### Organizational Problems

The task force noted that early in the data gathering phase of the study, it became apparent that most of the problem areas

of DP employment were associated directly or indirectly with organizational complexity. Consequently, the group said, its recommendations are primarily concerned with an organizational realignment of DP effort.

"Much of DoD's computer equipment is poorly applied, fragmented, underutilized, and obsolete, and installations of several of the military departments tend to be clustered together in geographic areas, but have very little effective consolidation of ADP facilities or of application programs," the study team found.

"Modern software and hardware configurations with powerful computation and operating systems, and using versatile communications links, have proven their ability to satisfy the needs of quite varied mixes of application requirements.

"They are able to do this at significant savings and with more capability than in fragmented situations," the group noted, adding: "As long as each component or even sub-component goes its own way in DP, not much can be done to correct the inefficiencies of fragmented load."

By designing one organization to supply DP support, one factor presently inhibiting the use of progressive DP techniques will be considerably improved.

"Also, the use of common facilities, or at least a common selection function, will provide the best environment for progress toward the much more subtle and difficult objective of reducing duplicate application effort."

As a practical means of establishing the single source of supply for DP and of initiating an

orderly replacement of facilities, all present equipment must be assigned to the FDP support office, the group stated.

As the new FDP system is implemented, some of the present equipment should be converted to terminal equipment and integrated into the overall system. This could be most effectively handled by assigning the equipment to the new organization.

Establishment of the proposed industrial fund would serve to shorten reaction time of ADP procurement and also provide a very good fiscal management tool, according to the study.

Most of the delay between conception and implementation of a project "appeared to be associated with the hardware justification and acquisition rather than with the application request approval. . . . Though, the total cycle delay often abrogated the early work done on the specifications."

"By using the industrial fund, the director could purchase or lease equipment or services without the necessity of waiting for the budget cycle," the task force stated.

The study team concluded that a number of benefits would accrue to the defense department as a result of its recommended changes, including:

- DoD would obtain better ADP support for less cost, primarily because of the economies of the larger computers;
- The responsibility for ADP decisions would be placed in an organization having the technical capability to make these decisions;

- DoD would be able to hire better qualified personnel for ADP systems activities because it would have a better career ladder and could afford higher salaries;

- The response time for implementing new ADP applications would be greatly reduced because a teleprocessing link would place the entire capability of the department's computer service network at the disposal of any user;

- DoD would have fewer types of computers, thus eliminating much duplication of programming;

- The use of an ADP industrial fund would provide visibility as to the total cost of ADP support, allowing better decision-making;

- By removing equipment procurement from the current budget and placing it in the fund, it would be possible to obtain needed equipment without the necessity for large appropriations and, and,

- A continuous review of the cost of ADP support would permit decisions to be made which would result in the ADP support to the department.

## Memory Market Projected at 360 Million Bits in 1975; Core Still Seen Leading

CHERRY HILL, N.J. — The memory industry is a growth industry within a growth industry and will chalk up growth curves of 40% a year through 1975, according to Richard Endres, president of Computek Corp.

The world memory consumption will reach 50 billion bits this year, Endres predicted in a recent interview, and will grow to over 360 billion bits by 1975. Computek has an unique vantage point from which to view the memory market, Endres claimed. Since it makes test equipment for core and plated wire memories and is taking a hard look at the semiconductor test market, the firm "talks to more memory people" than almost anyone else, he said.

In the 1970 market, core accounts for about 49 billion bits with plated wire the next closest competitor with 900 million bits, Endres said. MOS memories account for 60 million bits and bi-polar units account for 90-95 million bits, according to the Computek figures.

Core will still dominate the 1975 memory market, Endres said, but semiconductor will be making some inroads. Ironically, he said, the semiconductor contender is helping the core champion stay in the race through its use as a cache memory.

Cache memories made of semiconductor when used with a core memory "makes the core look awfully fast." At the same time, a memory system designed using cores with a small cache memory (typically 1% to 5% of the total system size) is able to take advantage of the low cost of the cores.

In the 1975 market, core shipments will reach 271 billion bits, Endres projected, with plated

wire units at 70 billion. MOS systems will account for about 20 billion bits and bi-polar will account for approximately 5 billion bits.

Other words, he said, "there's plenty of room for all of them to grow."

### Core Still for Big Memory

Core memories will continue to dominate the large memory market, Endres said, with the semiconductor inroads coming in the smaller memory areas.

Plated wire will find widest applications in aerospace and military markets, as well as overseas where it is in more widespread use than in this country.

The memory industry is an "elastic industry," Endres claimed, in that its volume is inversely proportional to price. If the price goes up, he said, the volume will double. So even if mainframe shipments were to hold their present level, the market for memories would grow.

In the future, Endres predicted that the "big action" would come in micro-magnetic memories such as the bubble memory under development at Bell Laboratories.

He foresaw a greater future for this type of technology than any of the other "blue sky" ideas such as optical memories that are currently under discussion. Endres also predicted that the communications industry would be one of the strongest markets for memory devices in the future through such developments at AT&T's Electronic Switching Systems.

On equipment, Endres said that new generations of testers would have to give "more hang for the buck" than present systems if they wanted to stay

competitive.

While the testers may get more expensive, they would offer more throughput for the dollar, he said.

The overseas market is an attractive one for test equipment, Endres indicated, and will account for approximately 40% of Computek business this year.

Even with the growing overseas manufacturing operations, he indicated that U.S. memory manufacturers would not experience much stronger competition than at the present.

"After all most American manufacturers presently do their manufacturing overseas, so they also take advantage of the lower labor rates," he said.

## Data Products Produces 'Fastest' Drum Printer

WOODLAND HILLS, Calif. — Data Products Corp. has made use of its Mark IV print hammer in the construction of an OEM line printer that is said to be the fastest drum printer currently available.

Not only is the hammer given credit by the company for making the 1,800 line/min speed of the 2470 printer possible, but it is also said to make possible a line registration that can be held to tolerances of ±0.010 in. for extended periods of time.

The 2470 achieves its speed of 1,800 line/min using a 36 character set. The use of a 64 character set drops the speed to 1,200 line/min.

The Mark IV hammer, which has been used by the company in previous products, is of one-piece construction, with no mechanical parts to wear.

According to the company, the hammer can maintain its adjustment for long periods of time and tests have shown a life expectancy of 500-million cycles. The printer is provided with standard Data Products TTL/DTL-compatible handshaking interface.

Optimum use of the 2470 printer, the company said, will be in high volume EDP applications. It produces up to six clear copies and can also be easily programmed to perform high quality OCR printing at reduced speed, the company added.

The 2470 will sell for under \$13,000 in OEM quantities, Data Products said. First deliveries will begin in the first quarter of 1971, with a 90-day schedule pertaining after that.

Data Products Corp. is at 6219 DeSoto Ave.

# Study Sees So-So Computer-Output-Microfilm Sales

NEWTONVILLE, Mass. — If you make computer-oriented microfilm equipment, things look good and things look bad.

This is the only way to sum up the reaction of 913 DP users polled by CW on the subject of computer-output-microfilm (COM). In general it seems that there will be a healthy percentage increase in COM use, but an increase over such a small base that in absolute terms, COM isn't going to set the world on fire.

Of the 913 respondents, 82% rejected the use of micrographic equipment for one simple, but insurmountable reason — lack of need. Only 3.4% of the sample currently use some form of micrographic equipment.

Projecting their equipment purchases, 18% of those polled said they would use some form of in-house micrographic equipment or use an outside service.

So today COM represents less than 4% of the \$2.5 billion output equipment base, and while a 45% growth in value is

expected this year, COM will still represent less than 5% in 1971.

## Who Uses COM?

One-third of all COM equipment is in service bureaus; the federal government uses another 20%; and the aerospace and electronics industries 10%. Durable goods manufacture accounts for another 8%.

While banks have only 3% of the installed COM base, that figure should grow to 18% within the next two to three years as they accept delivery of ordered systems.

The concentration of COM in service bureaus may be a harbinger of things to come. Of the sample, 5.4% contracted for micrographic services at outside bureaus in 1969.

By 1972, one in five will have an in-house system, and another 4% of the sample will begin using bureau micrographic services.

At the end of 1969 Stromberg Data-

graph had placed about two-thirds of the installed COM equipment, both in units and in value. The only other manufacturers with more than 5% of the micrographic market were CalComp with 6.5% and Control Data with 7.9%.

While Stromberg will continue to dominate the market, there was considerable interest in the lower priced offerings of Memorex, Seaco, and Peripheral Technology, Inc., who should achieve significant positions in the market. Stromberg has recently followed their lead and introduced a low-priced unit of its own.

## How's It Used?

Today, about half the sites with COM use it as a line printer replacement. Within three years, though, this figure will drop to 38%.

Seventy-nine percent of today's installations use their COM systems for frequent updating and printing to assure freshness. However, the 32% that use COM for this

activity only will decrease considerably; within three years less than one-fourth will dedicate their COM systems to business documentation alone.

In the future, while the main use of COM will continue to be for general business applications, more users will branch out into micropublishing and scientific graphics.

## Equipment Selection

COM users said that the most important criterion for selecting COM equipment are, in order of priority: reliability, output quality, price/performance, supporting software, expanded capability, equipment availability, and special features or options.

Over half the users of in-house systems are well satisfied with their COM operations, satisfied with the performance of their equipment, their supplier's response time, and the competence of its maintenance personnel.

Users of service bureaus were more unanimous in their praise; a likely result, since they experience the good results without the headaches of implementing a system.

## In the Future

The poll showed that at most only 25% of the in-house or service bureau users of COM would consider disk-to-COM recording today, and even those who would, question whether it would lead to the development of new COM-related applications.

Users felt that three to four different type fonts in association with a COM line printer would be sufficient. Color microfilm and microfilm cassettes aroused very little interest.

[Readers interested in a more detailed look at the COM market may contact International Data Corp., Newton, Mass., which has prepared a market study based on the poll.]

## Commerce Plans U.S. Exhibition at Fall Bias Display in Italy

WASHINGTON — The U.S. Department of Commerce will exhibit computer terminals and peripheral equipment at the Italian Biennial International Instrumentation and Automation Show (Bias), in Milan, Nov. 20-26, which is expected to assist U.S. industry in developing and expanding sales in Italy.

This exhibition will offer firms already in the Italian market and others a chance to show the latest developments in their lines.

The springboard will be a U.S. exhibition of computer equipment staged by the Department's Bureau of International Commerce (Bic) at Bias.

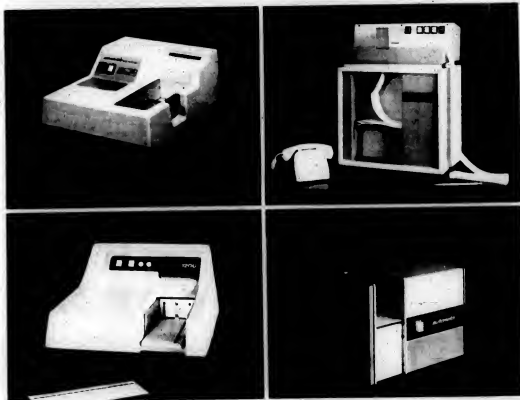
Bias will sponsor a congress at which original papers may be presented by foreign and Italian scientists and technicians.

Any U.S. firm interested in participating in either the congress or the technical lectures or both may apply directly to the organizers of the conference lectures at Fest, Pianzale Rodolfo Morandi, 2-20121 Milan, Italy.

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# UCC Gains 10% Control of LTV, Another 35% of CT

DALLAS — The coziness between University Computing and Ling-Temco-Vought is taking on the trappings of a permanent affair.

A UCC subsidiary, UCC Financial Corp., has acquired voting rights for nearly 10% of LTV voting securities, as well as an option to purchase up to one-half the shares. This is the largest single voting block in LTV.

The 432,487 shares, owned by former LTV head James J. Ling, are about 29% of the outstanding Class AA stock of the company, and represent about 9.5% of all the voting securities of the firm.

In a statement filed with the SEC, UCC Financial said it "would acquire [the stock], upon exercise of the option, ... if at all, for the purpose of investment."

UCC Financial acquired the rights as a result of Ling refunding the \$4 million unpaid balance of a loan from a Dallas bank. At recent prices for LTV stock, the 432,487 shares are worth about \$6.8

million.

Shortly before this acquisition UCC had acquired LTV Aerospace's remaining 35.5% interest in Computer Technology, Inc. (CT).

Computer Technology also revealed that it had signed a 10-year, \$250 million contract to fill substantially all LTV Aerospace's data processing needs.

## Finance

UCC acquired an initial 35.5% of CT's common stock from LTV Aerospace as a result of an agreement reached last Dec. 22. Acquisition of the additional shares will bring UCC's holdings of CT to 71%.

The new agreement is subject to approval by the boards of directors of UCC, LTV Aerospace, CT and Ling-Temco-Vought, Inc., as well as certain banking

institutions.

Terms of the new transaction include provisions for UCC to prepay its \$20 million note, which has been accomplished, and to deliver 280,000 shares of UCC common stock, to be registered by June 30, 1971, along with UCC's promissory note for \$16.15 million to LTV Aerospace.

This note, due Dec. 31, 1975, will bear no interest until Dec. 31, 1972, and thereafter will have an annual interest

rate of 8%, payable quarterly.

LTV Aerospace will deliver to UCC two million shares of CT common stock, transfer to UCC its ownership interest in the Academy of Computer Technology and Alcorn Combustion Co., and pay to UCC \$4,825 million in cash.

In addition, LTV Aerospace has paid Computer Technology for the \$200,000 management fee due from CT to UCC for the nine months ended Sept. 30.

## IBM's Third Quarter Earnings Set 3 Month Record, Revenues Rise

ARMONK, N.Y. — IBM's third quarter earnings set a record for any three month period while revenues rose 7.6% to register the second busiest quarter in the

company's history.

Net climbed 7.7% to \$259.9 million, or \$2.27 a share, from \$241.2 million, or \$2.13 a share, for the year earlier period.

Revenues were \$1.91 billion, up from \$1.78 billion. The only quarter to exceed this figure was 1968's fourth quarter, when revenues were \$1.98 billion.

IBM continues to lag behind its target 15% growth rate, however.

For the nine months, profit increased by 8.4% to \$742.3 million, or \$5.51 a share, while revenues grew 4% to \$5.51 billion.

The earnings report triggered a decline of almost \$6 in IBM's stock on the New York Stock Exchange. Street estimates of IBM third quarter earnings had been in the range of \$2.35 to \$2.40 per share, higher than the \$2.27 posted.

## Programming Methods Purchases CAI Work For Undisclosed Sum

NEW YORK — The people who signed contracts with bankrupt Computer Applications, Inc. are going to have their programming done by Programming Methods, Inc., which has purchased CAI's backlog.

PMI, a subsidiary of General Telephone and Electronics Corp., would not disclose the price it paid for the CAI backlog of about \$2 million. The purchase is subject to court approval and permission of various government agencies.

The purchased contracts involve some 200 CAI employees in New York, Washington, D.C., and Mountain View, Calif. CAI filed bankruptcy early this month after its cash resources were impounded by the Bank of New York as collateral for a loan. At first the company attempted to petition for reorganization under Chapter 10 of the Federal Bankruptcy Act, but a court denied the petition.

After the denial, the only option was bankruptcy and liquidation. In its Chapter 10 filing CAI listed total assets of \$12.9 million, current liabilities of \$7.4 million, and long term debt, primarily in the form of convertible debentures, of \$18.9 million.

## Sanders Reports 1970 Net Reversing Last Year's Loss

NASHUA, N.H. — Sanders Associates, Inc. has reported fiscal 1970 net income of \$782,000 or 17 cents per share, a reversal of last year's loss of \$1.95 million or a loss of 43 cents per share. Sales for the year ended July 31 were \$173.6 million or 7% less than last year's sales of \$187.1 million.

Sanders' president, Royden C. Sanders, Jr., stated that sales for the company's defense operations resulted in a modest profit for the year. Net income was also increased by its Navy contract settlement.

The company's commercial sales were 50% higher in fiscal 1970 over the prior year, he said.

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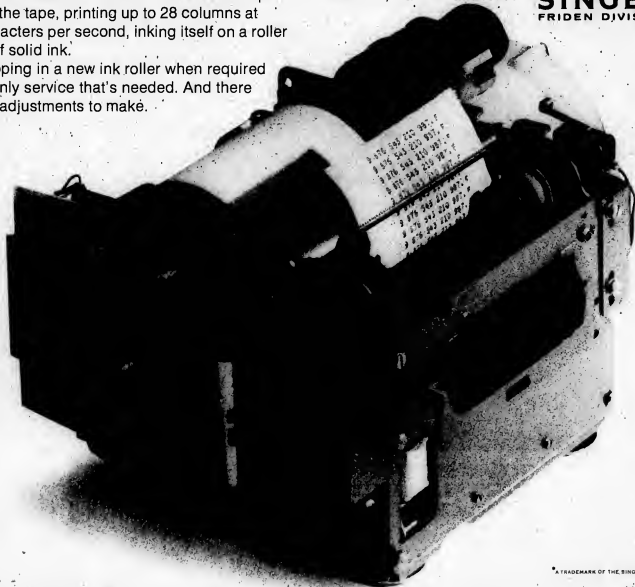
With this ad, we're introducing 30-character and 40-character alphanumeric printers, both of which work exactly the same as the standard Friden 20-character model. A little wheel zips across the tape, printing up to 28 columns at 46 characters per second, inking itself on a roller made of solid ink.

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And if you'd like complete information on all three Friden digital printers, ask Mr. Gary Dotzler, Sales Manager, OEM Products, Friden Division, The Singer Company, San Leandro, California 94577.

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## Business Too Good?

# Telemart Failure Laid to Overacceptance

SAN DIEGO, Calif. — Telemart Enterprises, "a bold venture in new supermarket techniques," after spending months developing a computerized method of delivering telephoned shopping lists, has gone bankrupt after

only two weeks of operation.

Because of overacceptance, the firm claims the computer system, developed by Rohr Corp., could handle the volume but getting the orders off the shelves and into the right shopping bags

for the right housewives provided the problems.

The company tried shutting off some phone lines to slow down the orders and tried adding people but the problems proved insurmountable.

In appealing for bankruptcy relief the company hopes that it will be able to go back into business and make the system work.

This is how it is supposed to work: a shopper would call in and give a credit number. The "teleshopper" would then put the computer on-line via a Touch-Tone telephone pad for a three-way conversation.

The credit rating of the customer would be checked first.

Then the shopper, using a catalog, would list the items wanted.

The computer system would record these, verify that they were in stock, give the price and also, through an IBM 7770 audio response unit, mention any specials of the day.

As the order was being placed the computer would accumulate price totals, print an optimized collection list for the warehouse and select the delivery truck that would most efficiently deliver the items to the particular address.

Telemart has filed for credit arrangement proceedings under the Bankruptcy Act's Chapter XI.

## When you need Accounts Payable

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(see Page 32)



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## Nickels and Dimes

From the Graham-Magnetics annual meeting: July and August pre-tax earnings were \$72,000 for the tape-maker, up from \$30,000 for July, August, and September last year. First quarter orders were predicted to top \$2 million, double that of the previous year. Graham Chairman George Jagers said that Epoch 4 tape — which sells for \$3 to \$5 more than regular tape — already accounts for a "major portion" of the company's commercial sales.

\$ \$ \$

Delta Automated Systems, the new amalgam of Delta Data, Computer Marketing Industries, and National Institutes of Computer Professions, says that elimination of duplicate costs will save the merged company over \$300,000 a year.

\$ \$ \$

Redcor has placed privately \$3 million of 8% 5-year convertible bonds. President Emil Borgers said that the financing was necessary because of "the severe cash flow problems" stemming from Redcor's acquisition of Penta Computer Associates, maker of data entry systems.

\$ \$ \$

First quarter earnings from International Timesharing Corp.: Profit, \$12,905 or one cent a share; revenues \$593,115. Last year the company lost \$313,653 on revenues of \$267,542 in the first quarter.

\$ \$ \$

UCC pre-paid its \$20 million note to LTV Aerospace (to pay for one 35.5% chunk of Computer Technology) by floating a \$20 million five-year loan with a London bank, name undisclosed.

\$ \$ \$

Also from Redcor, year-end figures, including Penta Computer show a loss of \$4.8 million, up from a loss of \$128,000 last year. Sales dropped from \$6.8 million to \$5.9 million.

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## TRADE QUOTES

Computerworld  
Stock Trading Summary

CLOSING PRICES THURSDAY, OCTOBER 15, 1970

PRICE					PRICE				
1970 CLOSING PRICE (1)	1970 CLOSING PRICE (1)	WEEK CHANGE	WEEK CHANGE	E X C H	1970 CLOSING PRICE (1)	1970 CLOSING PRICE (1)	WEEK CHANGE	WEEK CHANGE	E X C H
SOFTWARE & ERP SERVICES									
O ADVANCED COMP TECH	1-8	2 7/8	0	0.0	N BURROUGHS CORP	78-175	116 7/8	-5 3/4	-4.1
A APPLIED DATA RES.	4-24	7 1/8	-1/8	-5.0	N COLLINS RADIO	9-57	18 1/4	+1/4	+6.1
A APPLIED LOGIC	2-18	5 3/4	-1/8	-15.0	N CONTROL DATA CORP	50-122	48 1/4	+1/8	-2.2
O ARIES	1-8	7/8	-7/8	-30.0	A DIGITAL EQUIPMENT	50-224	75	-5 5/8	-6.9
A AUTOMATIC DATA PROC	25-17	10 1/2	+1/4	-0.5	N ELECTRONIC ASSOC.	3-11	5 1/4	0	0.0
O AUTO SCIENCES	5-14	5 3/4	-1	-14.0	A ELECTRONIC ENGINEER	5-14	8	-3/4	-11.1
D BRANIFF APPLIED SYS	1-9	1	0	0.0	N FORSDORF	18-35	25 1/2	0	0.0
O COMPUTER AGE INDUS.	1-5	3 1/2	-1/2	-25.0	O GENERAL AUTOMATION	9-42	13	-1/2	-11.1
O COMPUTER ENVIRON	3-14	2 1/2	-1/4	-9.0	N GENERAL ELECTRIC	68-86	84 1/2	-5/8	-5.7
O COMPUTER INDUS.	2-10	7	0	0.0	N HEMLETT-BACKARD CO	19-45	25 5/8	+1/8	+2.3
O COMPUTER NETWORK	3-14	4 1/4	-1 3/4	-29.1	N HONEYWELL INC	95-152	84 5/8	-1 1/8	-1.3
O COMPUTER PROPERTY	5-15	3 1/2	-1/2	-4.0	N IBM	125-387	375	+1/4	+1.1
N COMPUTER SCIENCES	8-14	11 3/4	-1/8	-5.0	N NCR	30-46	40 5/8	-1 3/8	-5.2
O COMPUTER USAGE	2-8	8	-1/8	-5.0	N RCA	18-34	25 1/8	-3/8	-12.7
A COMPUTING & SOFTWARE	18-75	35 5/8	-1	-5.0	N RAYTHEON CO	18-55	21	-3/8	-11.6
O CORRESS	10-5	7 7/8	+1/8	-5.0	O SCI. CONTROL CORP.	1-8	2 3/8	+1/8	-12.5
O COWHARRE	3-15	4 1/2	+1	-28.5	N SPERRY RAND	1-5	40 5/8	-7/8	-5.2
O CONSOL. ANAL. CENT.	5-15	3 1/2	-1/2	-4.0	N SYSTEMS ENG. LABS	10-49	20	-1/4	-11.2
O DATA AUTOMATION	1-24	2 7/8	+1/2	-15.0	N VARIAN ASSOCIATES	9-29	10	+1/4	+1.3
O DATA PACKAGING	5-29	8	+1/4	+5.2	A WANG LABS.	18-51	35	+3/4	+2.3
O DATAMATION SERVICE	1-8	2 1/4	+3/8	-14.7	N XEROX CORR	68-115	87	-5/8	-2.7
O DATATAM	2-12	2 1/8	-1/8	-4.0	LEASING COMPANIES				
O DIGITEST	2-5	1 1/2	0	0.0	O BROTHS COMPUTER	8-25	12 1/4	-1 1/2	-10.9
O ERP RESOURCES	3-15	8 1/2	-3/4	-4.0	O BRESNAHAN CORP	3-8	3 1/8	0	0.0
A ELECT COMP PROG	31-161	57	-3/4	-13.0	O BUSHNELL	2-8	8 3/8	-1/8	-2.1
O ELECTRONIC DATA SYS.	4-23	8	+5/8	-7.2	O COMPUTER LEASING	3-18	3	0	0.0
O INFORMATICS	4-23	8	+7/8	-12.3	N DATA PROC. F & O	6-32	14 1/4	+3/4	-5.0
A ITEL	4-23	8	+7/8	-12.3	O DATRONIC RENTAL	2-5	8 3/4	-1/4	-6.2
O LEVIN-TOWNSEND SERV.	1-15	11	-1/2	-14.2	A DEARBORN COMPUTER	10-24	18 7/8	-5/8	-0.6
A MANAGEMENT DATA	8-25	11	-2 5/8	-19.2	O DIEMOLD COMP. LEAS.	2-8	8 7/8	-1/2	-11.4
O NAT. COH. ANALYSTS	1-8	2 7/8	+1/8	+4.5	A OFA, INC.	4-10	5 3/8	-1/8	-2.2
O NAT. COMP. SERV.	13-24	25 1/4	+5/8	+2.7	A GRANITE MOT	7-22	11 7/8	-5/8	-5.0
N PLANNING RESEARCH	13-24	25 1/4	+5/8	+2.7	O LINC DATA, INC.	5-44	8 1/2	-1 1/8	-1.0
O PROGRAMMING MATHS	2-5	2 1/4	0	0.0	N LEASCH DATA PROF.	7-30	14 1/4	+7/8	-6.0
O PROGRAMMING & SYS	2-5	2 1/4	0	0.0	O LECTRA COMP LEAS	2-9	5 5/8	0	0.0
O PROGRAMMING SERVICES	2-5	2 1/4	+1/4	-11.1	A LEVIN-TOWNSEND CTR	3-14	8 1/4	0	0.0
N SCIENTIFIC RESOURCES	-2-22	2	-1/8	-2.4	O MANAGEMENT ASSIST	1-4	1 1/2	-1/8	-7.8
SOFTWARE SYSTEMS	5-27	3	-1/2	-9.0	O NCC INDUSTRIES	3-8	4 5/8	0	0.0
O TOS COMPUTER CENTERS	4-6	5 3/4	+1/2	-6.8	O SYSTEMS CAPITAL	1-8	8	-2/4	-5.5
O UNITED DATA CENTER	14-5	5 3/4	+1/2	-6.8	N U.S. LEASING	3-19	13 3/4	-1/2	-5.5
O DOLT, RESERVE & NEW	3-21	7 3/4	+1/8	+8.0	EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE				
A URS SYSTEMS	3-21	7 3/4	+1/8	+8.0	L=NATIONAL EXCHANGE; O=OVER THE COUNTER				
O U.S. TIME SHARING	3-15	8	-1/4	-4.0	O-T-C PRICES ARE OTC PRICES AS OF 3 P.M. OR LAST DAY				
(1) TO NEAREST COLLAR									
Computer Stocks Trading Index									
Computer Systems									
Peripherals & Subsystems									
Software & ERP Services									
Leasing Companies									
Supplies & Accessories									
CN Composite Index									
New Registrations									
COAP SYSTEMS, INC., 4010									
Hempstead Turnpike, Bayside,									
N.Y., a company engaged in the									
development of computer-oriented									
systems and the sale of ser-									
vices based upon such systems,									
has filed to register 128,158 shares									
of common stock and warrants to									
purchase 256,396 common shares.									
These securities are to be offered to holders									
of warrants originally sold in a									
warrant offering in August 1967 in which									
each consisting of one share and two									
warrants, upon payment of the									
original price of \$5.50 per share									
plus interest on the warrants for									
development of new computer									
programs and updating of existing pro-									
grams, expanding market operations									
and addition to working capital. No									
underwriter is involved.									
PROCESS SYSTEMS, INC., 3061									
Sheepskin St. Las Vegas, Nev., a									
company that designs, develops, man-									
ufactures and markets digital flow									
control systems which can be operated									
directly by a digital computer and									
complementary electronic equipment									
and systems for the automation of									
operation and control, has filed to									
register 750,000 shares of common									
stock. Proceeds, at \$3 per share									
of mechanical production equipment,									
construction of production facilities,									
increase of inventory; the proceeds									
will be applied to the company's									
working capital and used for general									
business purposes.									
These securities are to be offered to holders									
of warrants originally sold in a									
warrant offering in August 1967 in which									
each consisting of one share and two									
warrants, upon payment of the									
original price of \$5.50 per share									
plus interest on the warrants for									
development of new computer									
programs and updating of existing pro-									
grams, expanding market operations									
and addition to working capital. No									
underwriter is involved.									
PROCESS SYSTEMS, INC., 3061									
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increase of inventory; the proceeds									
will be applied to the company's									
working capital and used for general									
business purposes.									

Earnings  
Reports

RECTOR CORP.

Year Ended June 28

1970 1969

Revenue \$5,866,000 \$6,851,000

Net Income 478,000 437,000

Loss 4,824,000 126,000

a-Include operations of Penta Com-

puter Associates, Inc., acquired in

June 1970, on a pooling-of-interests

basis. b-Excludes sale of subsidiary

sold in June 1970 and sales to Penta

Computers, a Credit from the loss

carriedover. c-From write down in

investments in disposed subsidiary

and affiliated company.

FARRINGTON MFG CO.

Three Months Ended June 30

1970 1969

Revenue \$6,736,000

Loss 1,800,000

6 Mo Rev 13,031,000

Loss 5,712,000

a-Because of substantial year-end

adjustments in 1969, comparable

figures are not available, the company

said.

ERP RESOURCES INC.

Three Months Ended July 31

1970 1969

25th Rev

Earnings \$3,184,359 2,429,123

Spec Earnings 80,254 40,974

Net Income 2,400,000 1,400,000

a-Based on income before corporate

taxes. b-Excludes income from 1970

and 11 cents a share in 1969.

ELECTRONIC ASSOCIATES, INC.

Three Months Ended June 30

1970 1969

SW Earnings (\$1.34) 3.06

Revenue 8,501,000 11,195,000

(Loss) (\$3,443,000) 151,000

ELECTRO-CRAFT CORP.

Three Months Ended June 30

1970 1969

Revenue \$1,258,714 \$1,153,878

Earnings 27,500 12,350

6 Mo Rev 2,204,049 2,015,058

Earnings 80,254 40,974

a-the company and earnings reflect

expenses incurred in expansion of

facilities.

COMPUTER DIMENSIONS INC.

Three Months Ended June 30

1970 1969

SW Earnings 8.08 (\$8.19)

Revenue 1,281,594 1,024,888

Earnings 896,356 (180,667)

a-Mo SW 15 136

Revenue 2,498,180 1,963,202

Earnings 181,880 (335,628)

# MetaCOBOL.

Input  
PRINT BODY BY 2.

## COBOL.

Output  
WRITE BODY AFTER ADVANCING 2 LINES.  
MOVE SPACES TO BODY.  
ADD 2 TO LINE-COUNT.  
IF LINE-COUNT IS GREATER THAN 56  
PERFORM PAGE-HEADING-ROUTINE  
MOVE ZEROS TO LINE-COUNT.

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